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MAINTENANCE INTERVALS

Operation and Maintenance
Manual Excerpt

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Operation and Maintenance Manual

525C, 535C and 545C Wheel Skidders

5251-Up (525C)
5351-Up (535C)
5451-Up (545C)

i04793508

Maintenance Interval Schedule

SMCS Code: 7000

Ensure that all safety information, warnings and instructions are read and understood before any operation or any maintenance procedures are performed.

The user is responsible for the performance of maintenance, including all adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging. Failure to adhere to proper maintenance intervals and procedures may result in diminished performance of the product and/or accelerated wear of components.

Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, in order to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance.

Note: Before each consecutive interval is performed, all maintenance from the previous interval must be performed.

Note: If Cat HYDO Advanced 10 hydraulic oil is used, the hydraulic oil change interval will change. The normal interval of 2000 hours is extended to 3000 hours. S·O·S services may extend the oil change even longer. Consult your Cat dealer for details.

When Required

Battery - Recycle 194
Battery or Battery Cable - Inspect/Replace 196
Circuit Breakers - Reset 205
Engine Air Filter Primary Element - Clean/Replace 227
Engine Air Filter Secondary Element - Replace 231
Engine Air Precleaner - Clean 236
Ether Starting Aid Cylinder - Replace 248
Fuel System - Prime 250
Fuses - Replace 260
Oil Filter - Inspect 294
Radiator Core - Clean 295
Water Cleaning System (Pressurized) - Purge 315
Winch Wire Rope - Install 333
Window Washer Reservoir - Fill 335

Window Wiper - Inspect/Replace 336
Windows - Clean 337

Every 10 Service Hours or Daily

Air Cleaner Dust Valve - Clean/Inspect 189
Backup Alarm - Test 192
Cooling System Coolant Level - Check 213
Engine Air Filter Service Indicator - Inspect 233
Engine Oil Level - Check 239
Fuel System Primary Filter (Water Separator) - Drain 251
Grapple Boom and Arch (Dual Function) - Lubricate 265
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Grapple Head (Bunching) - Lubricate 267
Grapple Head (Continuous Rotation) - Lubricate 267
Grapple Head (Sorting) - Lubricate 271
Grapple Snubber - Inspect/Adjust 273
Hydraulic System Oil Level - Check 288
Seat Belt - Inspect 299
Transmission Oil Level - Check 312
Winch Oil Level - Check 331

Every 50 Service Hours or Weekly

Articulation Bearings - Lubricate 190
Axle Oscillation Bearings - Lubricate 191
Cab Air Filter - Clean/Replace 203
Differential and Final Drive Oil Level - Check 224
Fairlead Rollers - Lubricate 250
Fuel Tank Water and Sediment - Drain 259
Steering Cylinder Bearings - Lubricate 302
Tire Inflation - Check 304
Winch Drive Shaft Spline - Lubricate 318

Initial 100 Service Hours

Transmission Oil Filter - Replace 310

Every 100 Service Hours or 2 Weeks

Secondary Steering - Test 301

Every 250 Service Hours

Cooling System Coolant Sample (Level 1) - Obtain 214
Engine Oil Sample - Obtain 240

Every 250 Service Hours or Monthly

Battery - Clean 193
Belt - Inspect/Adjust/Replace 198
Brake Accumulator - Check 199
Braking System - Test 201
Engine Air Filter Service Indicator - Inspect/Replace 234
Water Cleaning System (Pressurized) - Test 317
Winch Drive Shaft Support Bearing - Lubricate 318
Winch Drive Shaft Universal Joint - Lubricate 319
Winch Fairlead Rollers - Lubricate 321

Initial 500 Hours (for New Systems, Refilled Systems, and Converted Systems)

Cooling System Coolant Sample (Level 2) - Obtain 216

Every 500 Service Hours

Differential and Final Drive Oil Sample - Obtain 225
Hydraulic System Oil Sample - Obtain 291
Transmission Oil Sample - Obtain 313
Winch Oil Sample - Obtain 332

Every 500 Service Hours or 3 Months

Engine Crankcase Breather - Clean 237
Engine Oil and Filter - Change 242
Fuel System Primary Filter (Water Separator) Element - Replace 252
Fuel System Secondary Filter - Replace 255
Fuel Tank Cap and Strainer - Clean 258
Grapple Head Rotator (Continuous Rotation) - Lubricate 272
Hydraulic System Oil Filter - Replace 286
Transmission Oil Filter - Replace 310
Winch Oil Filter - Replace 330

Every 1000 Service Hours

Engine Valve Lash - Check 247

Every 1000 Service Hours or 6 Months

Battery Hold-Down - Tighten 194
Rollover Protective Structure (ROPS) - Inspect 298
Transmission Oil - Change 305
Winch Drum Bearing - Lubricate 320
Winch Oil - Change 322

Every 2000 Service Hours or 1 Year

Brake Discs - Check 200
Cooling System Water Temperature Regulator - Replace 217
Differential and Final Drive Oil - Change 220
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Hydraulic Tank Breaker Relief Valve - Clean 293
Refrigerant Accumulator (With Desiccant) - Replace 297

Every Year

Cooling System Coolant Sample (Level 2) - Obtain 216

Every 3 Years After Date of Installation or Every 5 Years After Date of Manufacture

Seat Belt - Replace 300

Every 6000 Service Hours or 3 Years

Cooling System Coolant Extender (ELC) - Add 210

Every 12 000 Service Hours or 6 Years

Cooling System Coolant (ELC) - Change 206

i03239585

Air Cleaner Dust Valve - Clean/Inspect

SMCS Code: 1051-571-VL

1. Open the right side engine compartment.

2. The air filter housing is located on the right side of the machine. The air cleaner dust valve is located below the air filter housing.

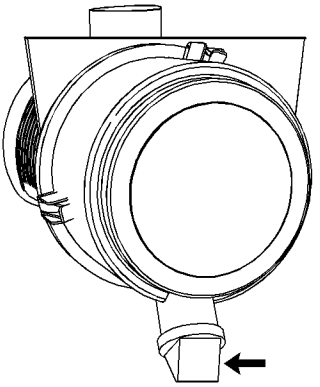

Illustration 112 g01645293

3. Check the air cleaner dust valve after every ten service hours or at the end of each day. Actuate the valve by squeezing the lips of the valve in order to remove any accumulated debris.

4. Close the engine compartment.

i02354839

Articulation Bearings - Lubricate

SMCS Code: 7057-086-BD; 7065-086-BD; 7066-086-BD

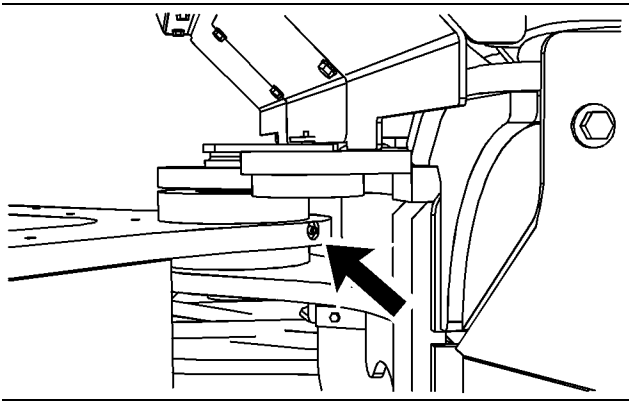

Illustration 113 g01176013

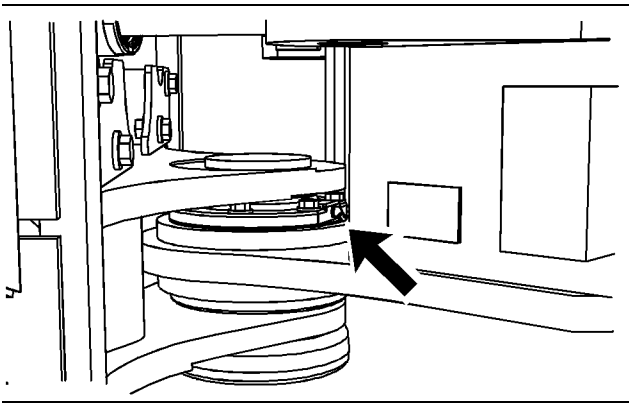

Illustration 114 g01176016

Place the steering frame lock into the LOCKED position before lubricating the articulation bearings.

Wipe the fittings before you apply lubricant.

Apply lubricant through one fitting on the upper hitch and through one fitting on the lower hitch.

There is a total of two fittings.

i02155797

Axle Oscillation Bearings - Lubricate

SMCS Code: 3278-086-BD

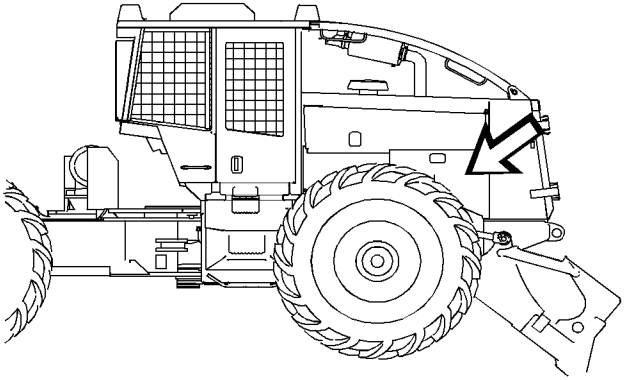

Illustration 115 g01093280

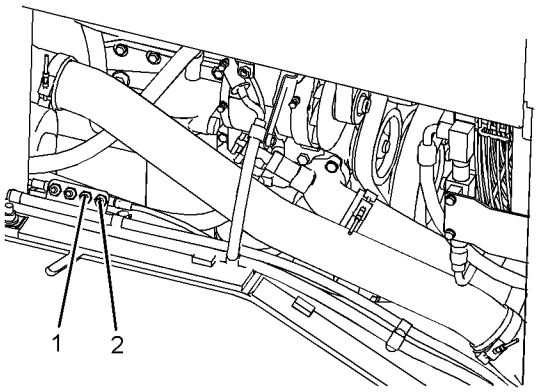

Illustration 116 g01097093

Open the engine access door on the right side of the machine.

Wipe off the fittings before you apply any lubricant.

Apply lubricant through two remote fittings (1) and (2) in order to grease the bearings for the oscillating axle.

i02261741

Backup Alarm - Test

SMCS Code: 7406-081

1. Turn the engine start switch to the ON position. Do not start the engine.
2. Move the transmission direction control switch to the REVERSE position.
3. The backup alarm should immediately sound. The backup alarm will continue to sound until the transmission control is moved to the NEUTRAL position or to the FORWARD position.

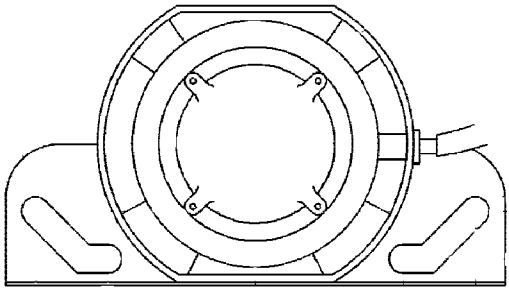

Illustration 117 g00930005

The backup alarm is mounted on the rear of the machine.

A three-position switch at the rear of the backup alarm regulates the sound of the alarm (HIGH, LOW, and MEDIUM).

The alarm is set at the maximum sound level when the machine is shipped from the factory. The setting should remain on HIGH unless the job site requires a lower sound level.

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Battery - Clean

SMCS Code: 1401-070

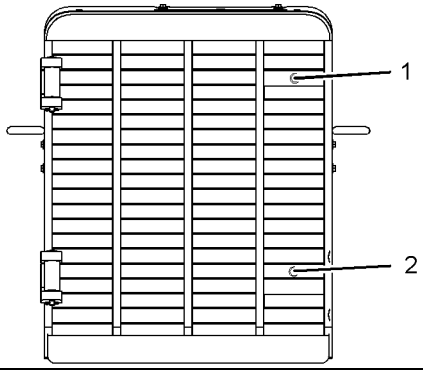

Illustration 118 g01089244

Before you can clean the battery terminals, you must open the radiator grill. The radiator grill is hinged in two places in the front of the machine. Use the following procedure to open the radiator grill.

Remove bolts (1) and (2) from the left side of the radiator grill. This will allow you to open the grill.

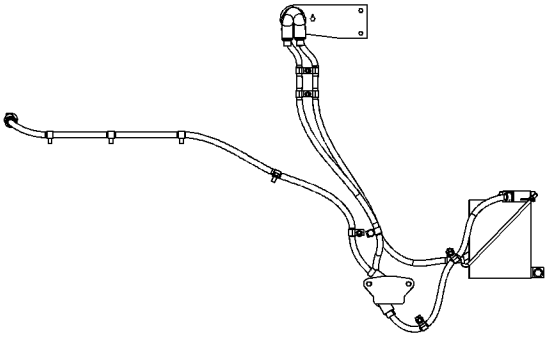

Illustration 119 g01089245

Clean the battery terminals and the surfaces of the batteries with a clean cloth. Coat the battery terminals with petroleum jelly. Make sure that the battery cables are installed securely.

i02039199

Battery - Recycle

SMCS Code: 1401-561

Always recycle a battery. Never discard a battery. Return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- A recycling facility

i02467359

Battery Hold-Down - Tighten

SMCS Code: 7257-527

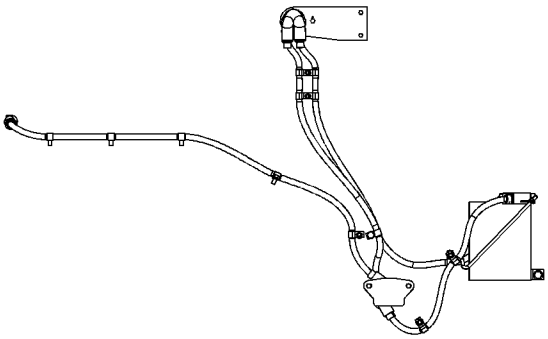

Illustration 120 g01089245

Before you can tighten the hold-downs for the batteries, you must open the radiator grill. The radiator grill is hinged in two places in the front of the machine. Use the following procedure to open the radiator grill:

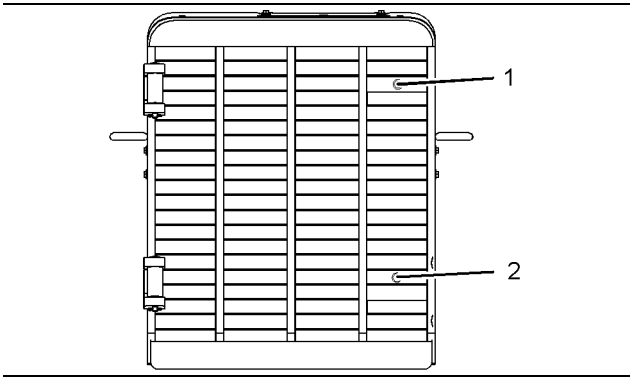

Illustration 121 g01089244

Remove bolts (1) and (2) from the left side of the radiator grill. This will allow you to open the grill.

Over time, the vibration of an operating machine can cause the battery retainers to loosen. To help to prevent loose batteries and the possibility of loose cable connections, tighten the three locknuts to a torque of 8 ± 2 N·m (71 ± 18 lb in).

Note: Do not operate the blade while the radiator door is open.

i03657099

Battery or Battery Cable - Inspect/Replace

SMCS Code: 1401-040; 1401-510; 1402-040; 1402-510

⚠ WARNING

Personal injury may occur from failure to properly service the batteries.

Batteries give off flammable fumes that can explode. Electrolyte is an acid and can cause personal injury if it contacts the skin or eyes.

Prevent sparks near the batteries. Sparks could cause vapors to explode. Do not allow jumper cable ends to contact each other or the engine. Improper jumper cable connections can cause an explosion.

Always wear protective glasses when working with batteries.

1. Turn the engine start switch key OFF. Turn all of the switches OFF.
2. Turn the battery disconnect switch OFF. Remove the key.
3. Disconnect the negative battery cable from the disconnect switch.

Note: Do not allow the disconnected battery cable to contact the disconnect switch.

4. Disconnect the negative battery cable at the battery.
5. Disconnect the positive battery cable at the battery.
6. Inspect the battery terminals for corrosion. Inspect the battery cables for wear or damage.
7. Make any necessary repairs. If necessary, replace the battery cables or the battery.
8. Connect the positive battery cable at the battery.

9. Connect the negative battery cable at the battery.

10. Connect the battery cable at the battery disconnect switch.

11. Install the key and turn the battery disconnect switch ON.

Recycle the Battery

Always recycle a battery. Never discard a battery.

Always return used batteries to one of the following locations:

- A battery supplier
- An authorized battery collection facility
- Recycling facility

i02216078

Belt - Inspect/Adjust/Replace

SMCS Code: 1397-025; 1397-040; 1397-510

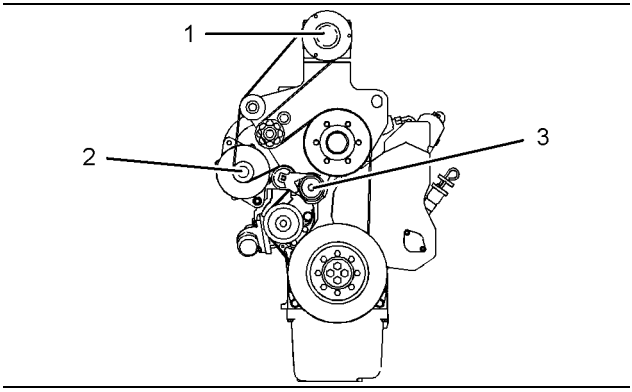

Illustration 122 g01090698

(1) Air conditioner compressor
(2) Alternator
(3) Belt tensioner

Your engine is equipped with a serpentine belt that drives the alternator (2) and the air conditioner compressor (1).

For maximum engine performance and maximum utilization of your engine, inspect the belt for wear and for cracking. Replace the belt, if necessary.

Insert a ratchet with a square drive into the square hole that is located in the belt tensioner (3). Rotate the belt tensioner (3) in order to relieve tension on the belt. Remove the belt.

Install the new belt correctly, as shown. The correct tension will automatically be applied. Be sure that the belt is fully seated on the pulleys.

i02173659

Brake Accumulator - Check

SMCS Code: 4263-535

1. Start the engine and run the engine at low idle.

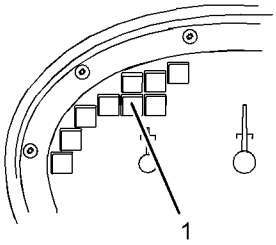

Illustration 123 g01101739

Note: The brake oil pressure indicator light (1) should come on when the engine is started. The indicator light should turn off when the braking system reaches normal operating pressure.

2. Allow the engine to idle for at least 30 seconds in order to fully charge the accumulators.

3. Turn the engine start switch to the OFF position.

4. Turn the engine start switch to the ON position but do not start the engine.

5. Depress the service brake pedal for at least eight applications until the indicator light comes on.

6. If the indicator light comes on after less than eight applications, check the nitrogen precharge pressure of the brake accumulator. Consult your Caterpillar dealer for the proper tools.

Note: To completely discharge the brake accumulator, depress the service brake pedal for at least 30 applications.

i02127658

Brake Discs - Check

SMCS Code: 4255-535

⚠ WARNING

Personal injury or death can result if two persons are not used in the following procedure.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Brake service life can vary greatly because of the different applications. The following conditions can lead to premature brake failure:

- The axle housing breather is damaged or plugged.
- Excessive heat is generated.
- Oil leaks at the yoke and the drive axles

A leak can also allow contamination from water and debris to occur. Water and debris can enter the axle through the lip seal at the drive yoke. The water and debris can mix with the oil. This water and debris can lead to premature brake failure.

Inspect wear on the brake discs in order to determine the remaining life of the brake discs.

Reference: For the procedure, refer to the Testing and Adjusting service manual of the braking system or consult your Caterpillar dealer.

i02391229

Braking System - Test

SMCS Code: 4251-081; 4267-081

- Park the machine on a dry, level surface.
- Check the area around the machine. Make sure that the machine is clear of personnel and clear of obstacles.
- Make sure that the steering frame lock is in the unlocked position.
- Fasten the seat belt before you test the brakes.

The following tests are used to determine whether the braking system is functional. These tests are not intended to measure the maximum brake holding effort. The required brake holding effort for sustaining a machine at a specific engine rpm varies from one machine to another machine. The variations include differences in the engine setting, the power train efficiency, the brake holding ability, etc.

Service Brake Holding Ability Test

⚠ WARNING

Personal injury can result if the machine moves while testing.

If the machine begins to move during test, reduce the engine speed immediately and engage the parking brake.

This test is performed when the service brakes are engaged. If the machine begins to move, compare the engine rpm to the engine rpm of a prior test. This will indicate the amount of system deterioration.

1. Start the engine. Raise the decking blade slightly. Apply the service brakes. Release the parking brake.

2. Move the transmission control to THIRD SPEED FORWARD while the service brakes are applied.

3. Gradually increase the engine speed to high idle. The machine should not move.

4. Reduce the engine speed to low idle. Move the transmission direction control to NEUTRAL. Engage the parking brake. Lower the decking blade to the ground. Stop the engine.

If the machine moved during the test, consult your Caterpillar dealer for a brake inspection. Make any necessary repairs before the machine is returned to operation.

Parking Brake Holding Ability Test

⚠ WARNING

Personal injury can result if the machine moves while testing.

If the machine begins to move, reduce the engine speed immediately and apply the service brake pedal.

This test is performed when the parking brake is engaged. If the machine begins to move, compare the engine rpm to the engine rpm of a prior test. This will indicate the amount of system deterioration.

1. Engage the parking brake.

2. Move the transmission direction control to the NEUTRAL position.

3. Start the engine. Apply the service brake. Disengage the parking brake. Press the upshift switch until the display shows 4N.

4. Engage the parking brake. Raise the decking blade slightly. Raise the grapple slightly. Release the service brake.

5. Move the transmission direction control to FOURTH SPEED FORWARD. Then move the transmission direction control back to NEUTRAL position. Then move the transmission direction control back to FOURTH SPEED FORWARD. The parking brake indicator should come on.

Note: The transmission will be in FOURTH SPEED FORWARD.

Note: This will cause a level 3 warning, which will activate the alarm.

6. Gradually increase the engine speed to high idle. The machine should not move.

7. Reduce the engine speed to low idle. Move the transmission direction control to NEUTRAL. Lower the decking blade. Lower the grapple to the ground. Stop the engine.

If the machine moved during the test, consult your Caterpillar dealer for a brake inspection. Make any necessary repairs before the machine is returned to operation.

i02408600

Cab Air Filter - Clean/Replace

SMCS Code: 7342-070; 7342-510

Note: When you are operating the machine in dusty conditions, clean the cab air filters more often.

Illustration 124 g00584743

1. Open the access door on the rear of the cab.

2. Remove the filter element.

3. Replace the filter element. The filter element is disposable.

4. Close the access door on the rear of the cab.

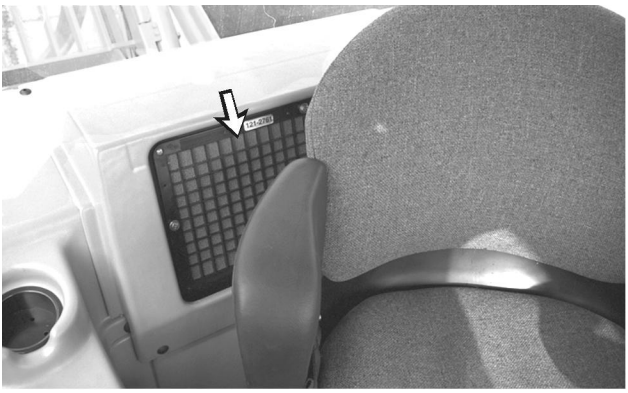

Illustration 125 g00584744

5. Remove four bolts and the filter cover behind the seat inside the cab. Remove the filter element.

6. Clean the filter element with pressure air or wash the filter elements in warm water with a nonsudsing household detergent. Rinse the filter element with clean water and allow the filter elements to air dry thoroughly.

7. Install the filter element. Install the filter cover.

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Circuit Breakers - Reset

SMCS Code: 1420-529

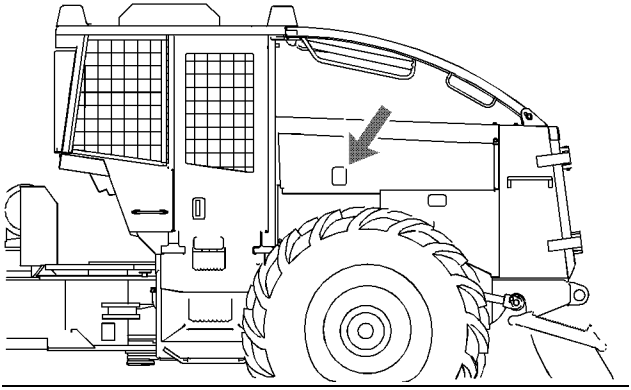


Illustration 126 g01097660

The circuit breakers are located on the right side of the machine in the engine compartment. Open the access panel on the right side of the machine.

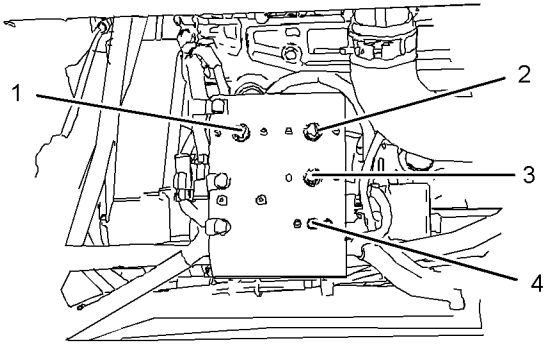


Illustration 127 g01097663

Press the reset button in order to reset circuit breaker (1). Circuit breaker (1) is the breaker for the thermal starting aid. The thermal starting aid is an air inlet heater.

Press the reset button in order to reset circuit breaker (2). Circuit breaker (2) is for the breaker for the alternator.

Press the reset button in order to reset circuit breaker (3). Circuit breaker (3) is the main breaker for the electrical system.

Press the reset button in order to reset circuit breaker (4). Circuit breaker (4) is for the unswitched circuits.

If the button remains depressed, the electrical circuit is functioning properly. If the button does not remain depressed, check the appropriate electrical circuit.

i02216952

Cooling System Coolant (ELC) - Change

SMCS Code: 1350-044

NOTICE
Topping off or mixing Cat ELC with other products that do not meet Caterpillar EC-1 specifications reduces the effectiveness of the coolant and shortens coolant service life.

Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specification for pre-mixed or concentrate coolants. Use only Extender with Cat ELC.

Failure to follow these recommendations can result in shortened cooling system component life.

If an Extended Life Coolant was previously used, flush the cooling system with clean water. No other cleaning agents are required. Use the following procedure to change the cooling system coolant (ELC):

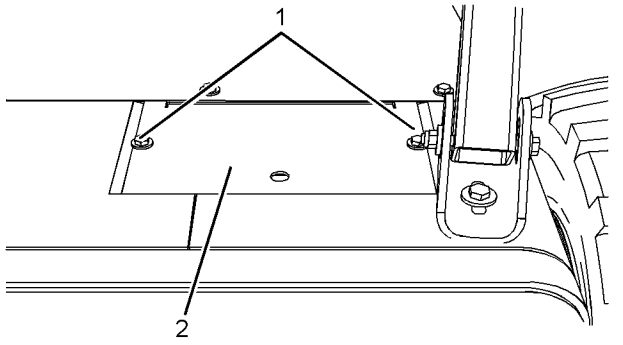


Illustration 128 g01118819

1. Remove bolts (1) and the access door (2) on the top front part of the machine.

⚠ WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

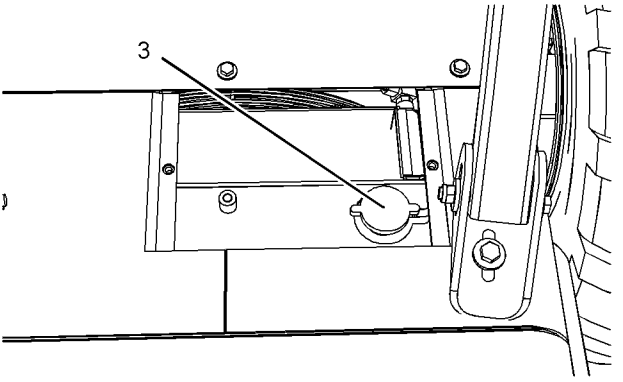


Illustration 129 g01118820

2. Slowly loosen the cooling system pressure cap (3) in order to relieve system pressure.

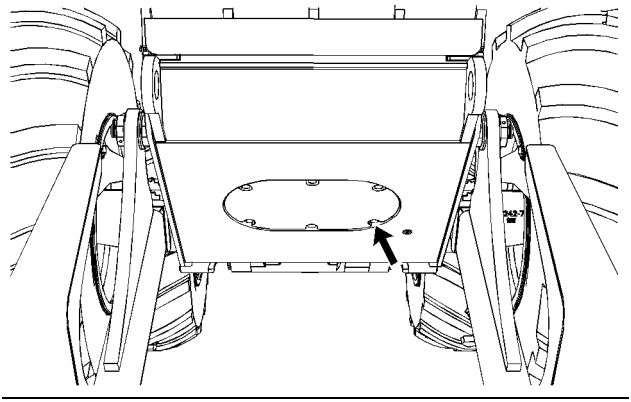


Illustration 130 g01180997

3. Remove the bottom guard at the front of the machine. Pull out the drain hose through the opening.

4. Open the engine access door on the left side of the machine.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

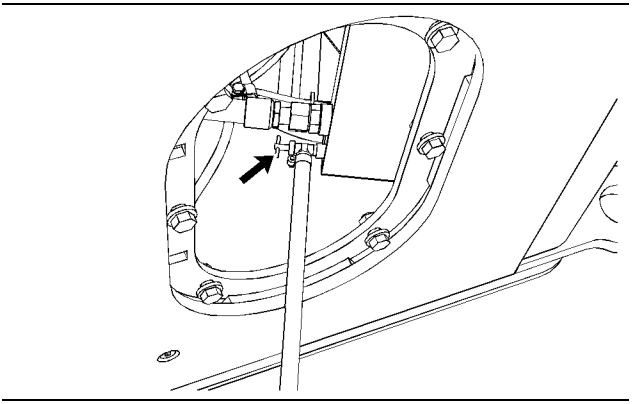


Illustration 131 g01204097

5. Open the drain valve at the bottom of the radiator. Allow the coolant to drain into a suitable container.

6. Flush the cooling system with clean water until the draining water is clean. Close the drain valve.

7. Replace the water temperature regulator.

Reference: For the correct procedure, refer to Operation and Maintenance Manual, “Cooling System Water Temperature Regulator - Replace”.

8. Add the Extended Life Coolant (ELC).

Reference: For the capacity of the cooling system, refer to Operation and Maintenance Manual, “Capacities (Refill)”.

9. Start the engine. Run the engine without the cooling system pressure cap until the water temperature regulator opens and the coolant level stabilizes.

10. Stop the engine.

11. Install the cooling system pressure cap (3).

12. Install the access door (2) and the bolts (1).

13. Check the cooling system coolant level.

Reference: For the correct procedure, refer to Operation and Maintenance Manual, “Cooling System Coolant Level - Check”.

14. Reinstall the bottom guard.

i02216953

Cooling System Coolant Extender (ELC) - Add

SMCS Code: 1352-544-NL

NOTICE

Topping off or mixing Cat ELC with other products that do not meet Caterpillar EC-1 specifications reduces the effectiveness of the coolant and shortens coolant service life.

Use only Caterpillar products or commercial products that have passed the Caterpillar EC-1 specification for pre-mixed or concentrate coolants. Use only Extender with Cat ELC.

Failure to follow these recommendations can result in shortened cooling system component life.

When a Caterpillar Extended Life Coolant (ELC) is used, an Extender must be added to the cooling system.

Use a coolant test kit in order to check the concentration of the coolant solution.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

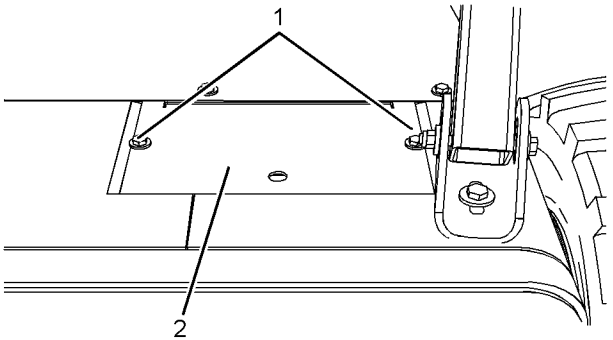


Illustration 132 g01118819

1. Remove bolts (1) and the access door (2) on the top front part of the machine.

⚠ WARNING

Pressurized system: Hot coolant can cause serious burn. To open cap, stop engine, wait until radiator is cool. Then loosen cap slowly to relieve the pressure.

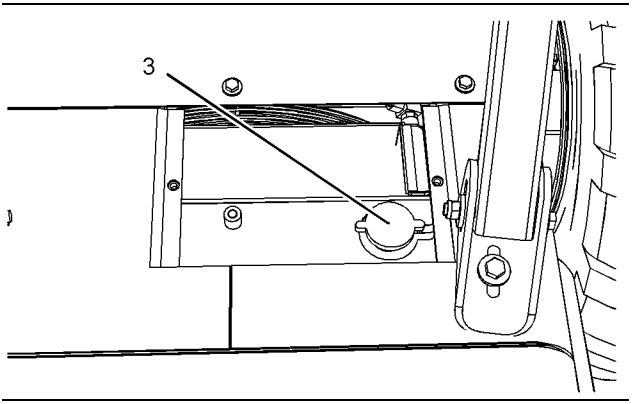


Illustration 133 g01118820

2. Slowly remove the cooling system pressure cap (3) in order to relieve system pressure.

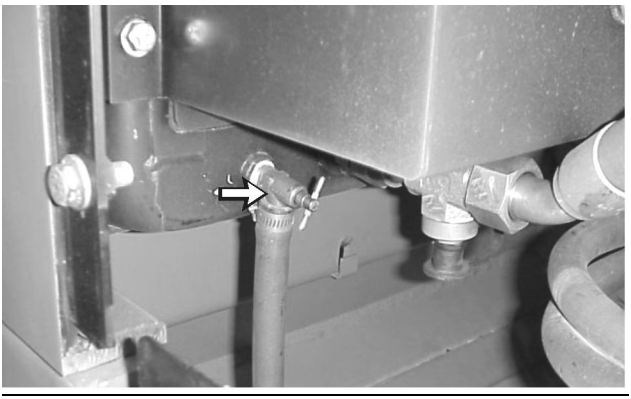


Illustration 134 g00671272

3. If necessary, drain enough coolant into a suitable container in order to allow the addition of the Extender to the cooling system. Open the engine access door on the left side of the machine. The coolant drain valve is located at the bottom of the radiator on the left side of the machine.

4. Maintain the coolant level within 13 mm (0.5 inch) of the bottom of the filler pipe.

5. Install the cooling system pressure cap. Close the access door.

i02164357

Cooling System Coolant Level - Check

SMCS Code: 1350-535-FLV

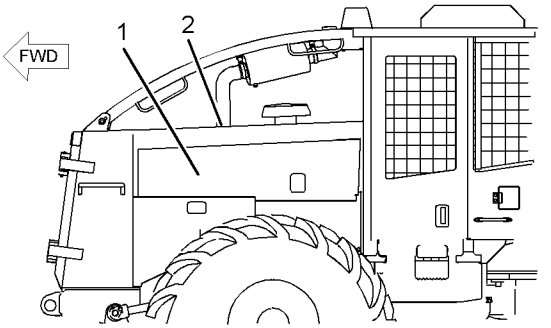


Illustration 135 g01097780

1. Open the engine access door (1).

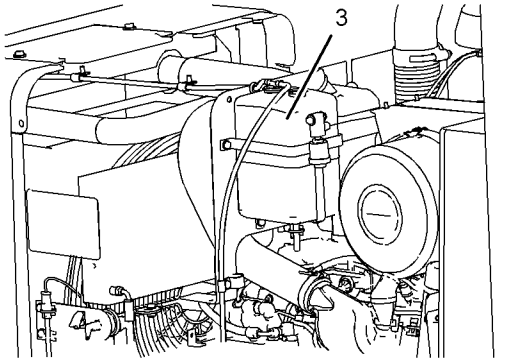


Illustration 136 g01097787

2. Maintain the coolant level between the FULL and the LOW marks on the coolant reservoir (3).

Note: If it is necessary to add coolant daily, check for leaks.

3. If more coolant is needed open engine access door (2).

4. Open the cap on the top of the coolant reservoir (3) and add coolant until the coolant level is between the FULL and LOW marks on the coolant reservoir (3).

i02251419

Cooling System Coolant Sample (Level 1) - Obtain

SMCS Code: 1350-008; 1395-008; 7542

Note: It is not necessary to obtain a Coolant Sample (Level 1) if the cooling system is filled with Cat ELC (Extended Life Coolant). Cooling systems that are filled with Cat ELC should have a Coolant Sample (Level 2) that is obtained at the recommended interval that is stated in the Maintenance Interval Schedule.

Note: Obtain a Coolant Sample (Level 1) if the cooling system is filled with any other coolant instead of Cat ELC. This includes the following types of coolants.

- Commercial long life coolants that meet the Caterpillar Engine Coolant Specification -1 (Caterpillar EC-1)
- Cat Diesel Engine Antifreeze/Coolant (DEAC)
- Commercial heavy-duty coolant/antifreeze

NOTICE

Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

Note: Level 1 results may indicate a need for Level 2 Analysis.

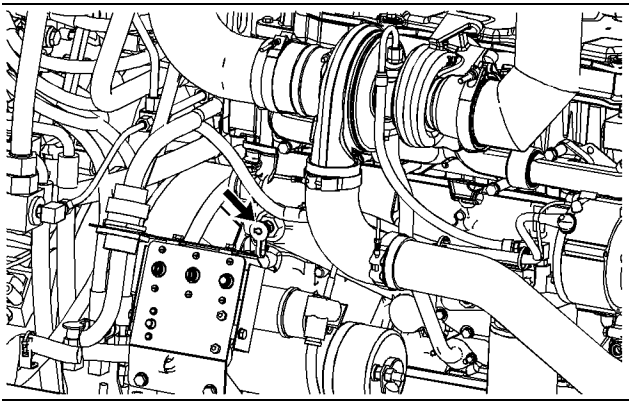


Illustration 137 g01195489

1. Obtain the sample of the coolant as close as possible to the recommended sampling interval. In order to receive the full effect of S·O·S analysis, you must establish a consistent trend of data. In order to establish a pertinent history of data, perform consistent samplings that are evenly spaced. Supplies for collecting samples can be obtained from your Caterpillar dealer.

Use the following guidelines for proper sampling of the coolant:

- Complete the information on the label for the sampling bottle before you begin to take the samples.
- Keep the unused sampling bottles stored in plastic bags.
- Obtain coolant samples directly from the coolant sample port. You should not obtain the samples from any other location.
- Keep the lids on empty sampling bottles until you are ready to collect the sample.
- Place the sample in the mailing tube immediately after obtaining the sample in order to avoid contamination.
- Never collect samples from expansion bottles.
- Never collect samples from the drain for a system.

2. Submit the sample for Level 1 analysis.

For additional information about coolant analysis, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i02471396

Cooling System Coolant Sample (Level 2) - Obtain

SMCS Code: 1350-008; 1395-008; 7542

NOTICE
Always use a designated pump for oil sampling, and use a separate designated pump for coolant sampling. Using the same pump for both types of samples may contaminate the samples that are being drawn. This contaminate may cause a false analysis and an incorrect interpretation that could lead to concerns by both dealers and customers.

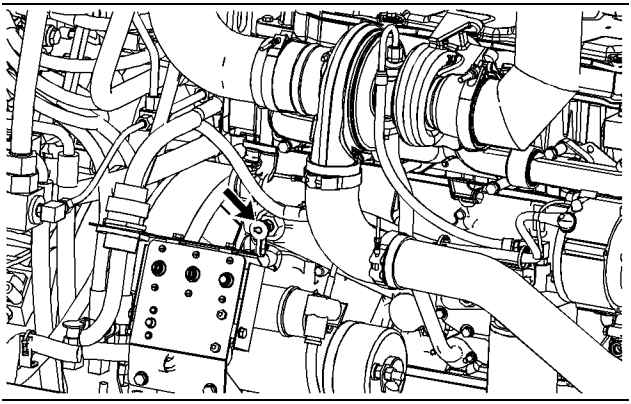


Illustration 138 g01195489

1. Obtain the sample of the coolant as close as possible to the recommended sampling interval. Supplies for collecting samples can be obtained from your Caterpillar dealer.

   Reference: Refer to Operation and Maintenance Manual, “Cooling System Coolant Sample (Level 1) - Obtain” for the guidelines for proper sampling of the coolant.

2. Submit the sample for Level 2 analysis.

Reference: For additional information about coolant analysis, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” or consult your Caterpillar dealer.

i04333314

Cooling System Water Temperature Regulator - Replace

SMCS Code: 1355-510; 1393-010

NOTICE
Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting, and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

Replace the thermostat on a regular basis per the maintenance interval schedule. This action reduces the chance of unscheduled downtime and of problems with the cooling system.

A new thermostat should be installed after the cooling system has been cleaned. Install the thermostat while the cooling system is drained completely. Or install the thermostat while the cooling system coolant is drained to a level that is below the thermostat housing.

NOTICE
Failure to replace the engine's thermostat on a regularly scheduled basis could cause severe engine damage.

Note: If you are only installing a new thermostat, drain the cooling system coolant to a level that is below the thermostat housing.

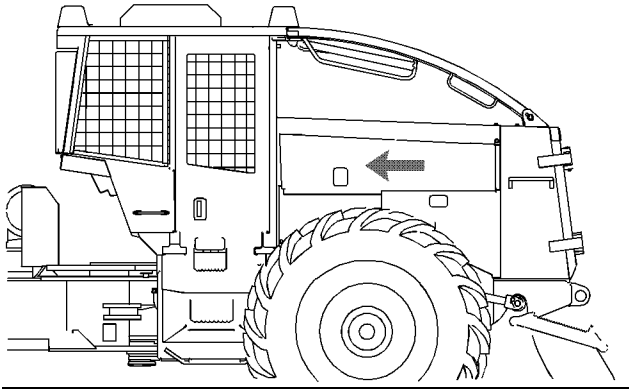


Illustration 139 g01097799

1. Open the right engine compartment.

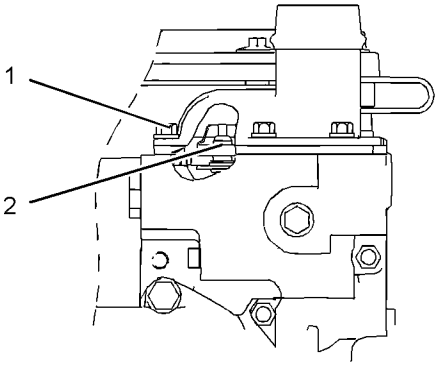


Illustration 140 g01097811

The water temperature regulator housing is located on the front right side of the engine.

Regulator housing (1). Water temperature regulator (2).

2. Remove the bolts from regulator housing (1). Remove the regulator housing (1). Remove all of the used gasket from the regulator housing (1).

3. Remove the water temperature regulator (2).

NOTICE

Since Caterpillar engines incorporate a shunt design cooling system, it is mandatory to always operate the engine with a thermostat.

Depending on load, failure to operate with a thermostat could result in either an overheating or an overcooling condition.

NOTICE

If the thermostat is installed incorrectly, it will cause the engine to overheat.

4. Install a new water temperature regulator (2).

5. Install a new gasket and the two bolts on regulator housing (1). Install the thermostat housing on the engine cylinder head.

6. Close the right engine compartment.

7. Replace the coolant that was drained from the system. Refer to Operation and Maintenance Manual, “Capacities (Refill)”.

i02338399

Differential and Final Drive Oil - Change

SMCS Code: 3278-044; 4011-044

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Note: The axles on this machine are equipped with ecology drain valves.

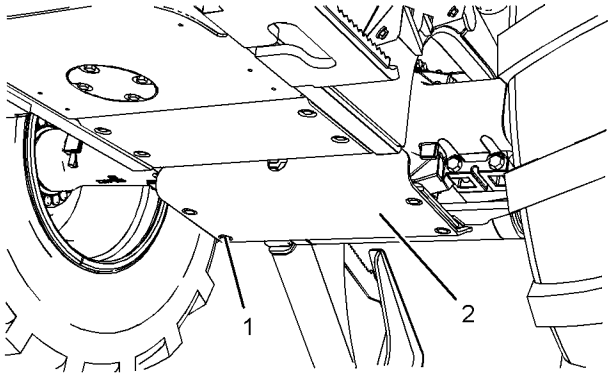


Illustration 141 g01167201

Front Axle

1. Remove bolts (1) and plate (2).

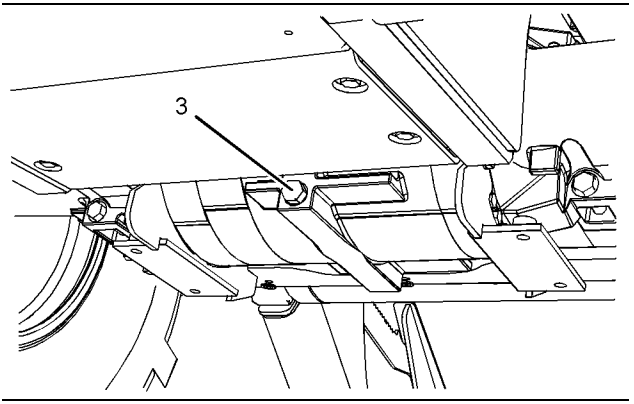


Illustration 142 g01167202
Front Axle

2. Remove the drain plug (3) near the bottom of the differential housing.

3. Attach a hose to a suitable drain adapter. Install the adapter in the drain valve and allow the oil to drain into a suitable container.

4. Remove the adapter and the hose.

5. Remove the ecology drain valve. Inspect the magnet on the end for metal particles.

6. Clean the metal particles from the magnet. Install the valve.

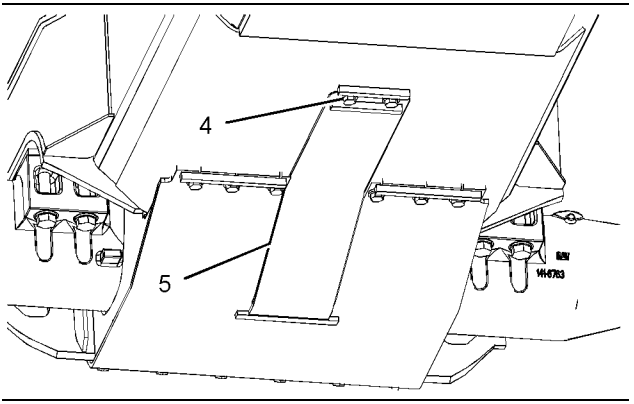


Illustration 143 g01231823
Rear Axle

7. Remove the plate (5) from the rear bottom guard in order to access the drain plug for the rear differential.

Note: The plate is slotted. Remove two bolts (4), and then loosen the remaining two bolts. The plate will slide downward. Remove the plate from the guard.

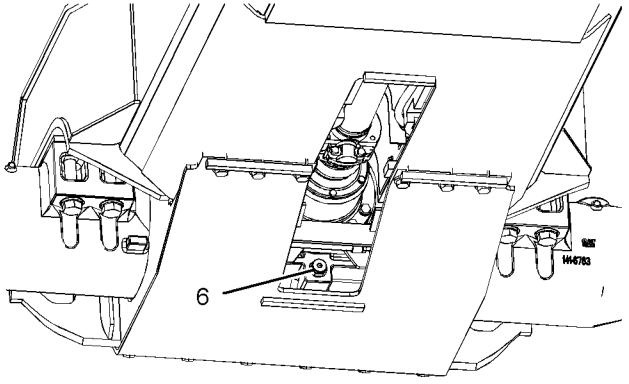


Illustration 144 g01231828

Rear Axle

8. Remove the drain plug (6) near the bottom of the differential housing.

Note: Remove the dipstick on the right side of the axle, in order to improve the oil flow while the oil is draining.

9. Attach a hose to a suitable drain adapter. Install the adapter in the drain valve and allow the oil to drain into a suitable container.

10. Remove the adapter from the drain valve.

11. Clean the drain plug and install the drain plug.

12. Install the plate to the guard underneath the machine.

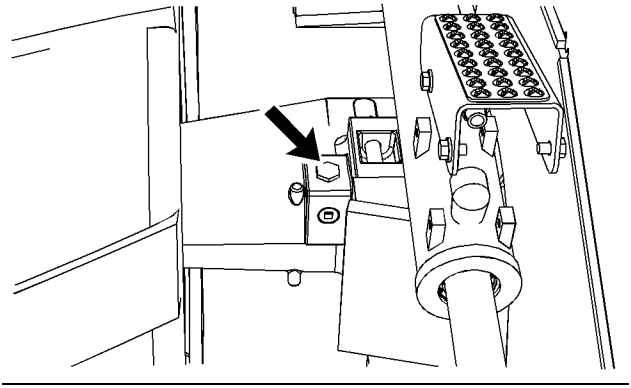


Illustration 145 g01167247
Front Axle (Right Side)

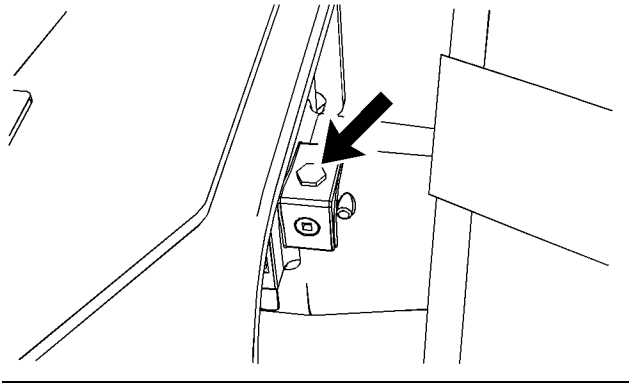


Illustration 146 g01167248
Rear Axle (Left Side)

13. Remove the dipstick/fill plugs on the right side of the axle. Add oil through the opening.

Reference: Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the proper amount of oil.

14. Clean the plugs and install the plugs.

15. Check the oil level.

Reference: Refer to Operation and Maintenance Manual, “Differential and Final Drive Oil Level - Check” for the correct procedure.

i02338442

Differential and Final Drive Oil Level - Check

SMCS Code: 3278-535-FLV; 4011-535-FLV

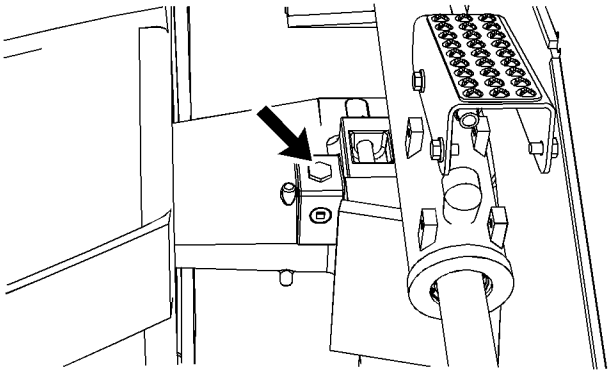


Illustration 147 g01167247

Front Axle (Right Side)

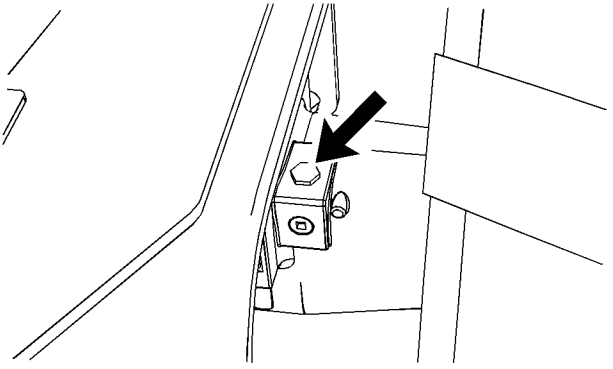


Illustration 148 g01167248

Rear Axle (Left Side)

1. Remove the dipstick/fill plug on the axle and wipe off the dipstick with a clean cloth. This will ensure a more accurate measurement. Reinsert the dipstick/fill plug.

Note: Make sure that the dipstick/fill plug is installed tightly before you check the oil level. Otherwise, the oil level reading may be incorrect.

2. Remove the dipstick/fill plug again and check the oil level on the dipstick. The oil level should be between the “ADD” mark and the “FULL” mark. Add oil through the opening, if necessary.

3. Clean the plug and install the plug.

i02338440

Differential and Final Drive Oil Sample - Obtain

SMCS Code: 3278-008; 4011-008; 4070-008; 7542

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the machine for a few minutes before you obtain the fluid sample. This will thoroughly mix the fluid for a more accurate sample.

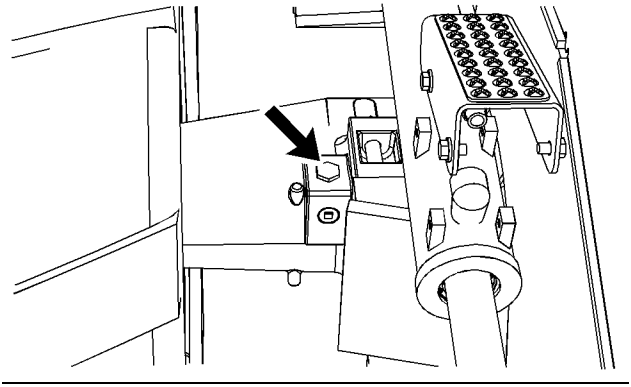


Illustration 149 g01167247
Front Axle (Right Side)

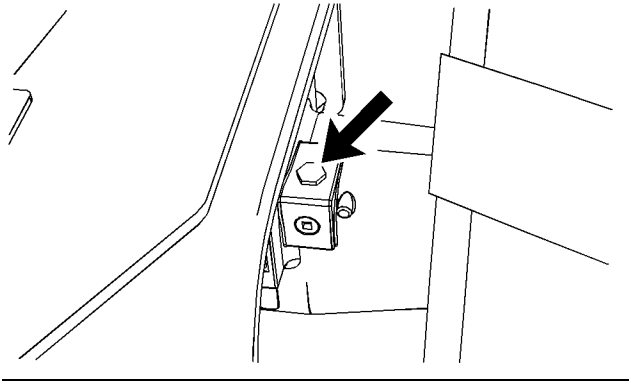


Illustration 150 g01167248
Rear Axle (Left Side)

The axles are not equipped with sampling valves. Obtaining a sample of the differential and final drive oil will require a vacuum pump or an equivalent. Remove the dipstick/fill plug on the right side of each axle and withdraw the oil through the filler opening.

Reference: For more information, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” and Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

i02468548

Engine Air Filter Primary Element - Clean/Replace

SMCS Code: 1054-070-PY; 1054-510-PY

NOTICE
Service the air filter only with the engine stopped. Engine damage could result.

NOTICE
Always change the air filter based on the Air Filter Service Indicator. Do not based service on the appearance of the filter.

1. The air filter is located on the left side of the machine. Open the engine access panel.

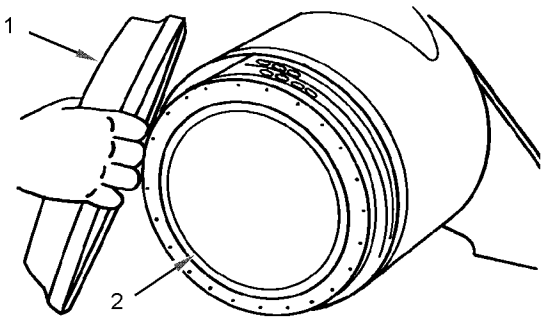


Illustration 151 g01096335

2. Remove cover (1).

3. Remove air filter element (2).

WARNING

To avoid personal injury, always wear eye and face protection when using pressurized air.

4. Clean the inside of the air filter housing.

5. Install a clean primary air filter element. For more information, refer to “Cleaning the Primary Air Filter Element”.

6. Install cover (1).

7. Close the engine access panel.

Cleaning the Primary Air Filter Element

NOTICE

Caterpillar recommends certified air filter cleaning services available at participating Caterpillar dealers. The Caterpillar cleaning process uses proven procedures to assure consistent quality and sufficient filter life.

Observe the following guidelines if you attempt to clean the filter element:

Do not tap or strike the filter element in order to remove dust.

Do not wash the filter element.

Use low pressure compressed air in order to remove the dust from the filter element. Air pressure must not exceed 207 kPa (30 psi). Direct the air flow up the pleats and down the pleats from the inside of the filter element. Take extreme care in order to avoid damage to the pleats.

Do not use air filters with damaged pleats, gaskets, or seals. Dirt entering the engine will cause damage to engine components.

The element can be reused up to six times when the element is properly cleaned and inspected after each use. When the primary air filter element is cleaned, check for rips or tears in the filter material. The primary air filter element should be replaced at least one time per year. This replacement should be performed regardless of the number of cleanings.

NOTICE
Do not clean the air filter elements by bumping or tapping. This could damage the seals. Do not use elements with damaged pleats, gaskets, or seals. Damaged elements will allow dirt to pass through. Engine damage could result.

Visually inspect the primary air filter element before cleaning. Inspect the air filter element for damage to the seal, the gaskets, and the outer cover. Discard any damaged air filter elements.

There are two common methods that are used to clean the primary air filter element:

- Pressurized air
- Vacuum cleaning

Pressurized Air

Pressurized air can be used to clean a primary air filter element that has not been cleaned more than two times. Pressurized air will not remove deposits of carbon and oil. Use filtered, dry air with a maximum pressure of 207 kPa (30 psi).

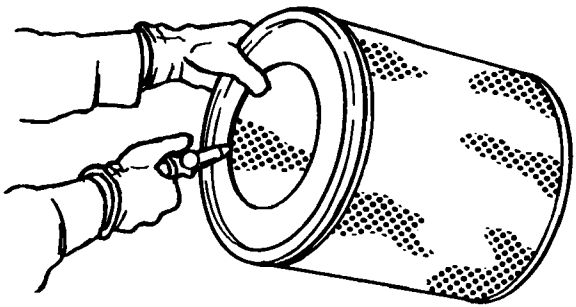


Illustration 152 g01096212

Note: When the primary air filter element is cleaned, always begin with the inside of the filter in order to force dirt particles toward the outside.

Aim the hose so that the air flows inside the element along the length of the filter in order to help prevent damage to the paper pleats. Do not aim the stream of air directly at the primary air filter element. Dirt could be forced further into the pleats.

Vacuum Cleaning

Vacuum cleaning is another method for cleaning a primary air filter element which requires daily cleaning because of a dry, dusty environment. Cleaning with pressurized air is recommended prior to vacuum cleaning. Vacuum cleaning will not remove deposits of carbon and oil.

Inspecting the Primary Air Filter Elements

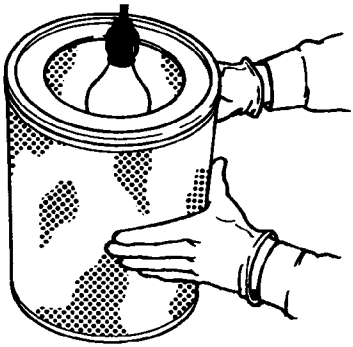


Illustration 153 g01096213

Inspect the clean, dry primary air filter element. Use a 60 watt blue light in a dark room or in a similar facility. Place the blue light in the primary air filter element. Rotate the primary air filter element. Inspect the primary air filter element for tears and/or holes. Inspect the primary air filter element for light that may show through the filter material. If it is necessary in order to confirm the result, compare the primary air filter element to a new primary air filter element that has the same part number.

Do not use a primary air filter element that has any tears and/or holes in the filter material. Do not use a primary air filter element with damaged pleats, gaskets or seals. Discard damaged primary air filter elements.

Storing Primary Air Filter Elements

If a primary air filter element that passes inspection will not be used, the primary air filter element can be stored for future use.

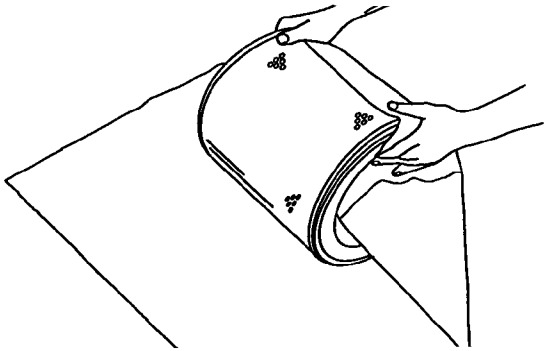


Illustration 154 g01096217

Do not use paint, a waterproof cover, or plastic as a protective covering for storage. An airflow restriction may result. To protect against dirt and damage, wrap the primary air filter elements in Volatile Corrosion Inhibited (VCI) paper.

Place the primary air filter element into a box for storage. For identification, mark the outside of the box and mark the primary air filter element. Include the following information:

- Date of cleaning
- Number of cleanings

Store the box in a dry location.

i02468628

Engine Air Filter Secondary Element - Replace

SMCS Code: 1054-510-SE

1. The air filter is located on the left side of the machine. Open the engine access panel.

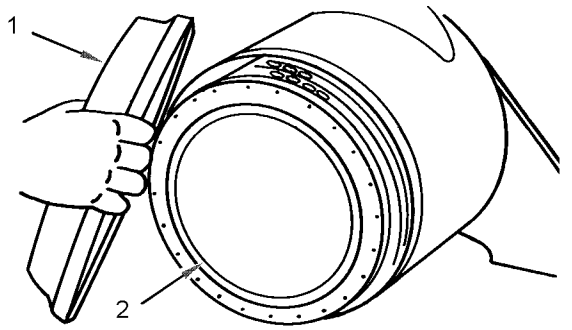


Illustration 155 g01096209

2. Remove cover (1) from the air filter housing.

Note: If necessary, unclamp the strap on the air filter housing so that the air filter housing can be moved for better access.

3. Remove primary element (2) from the air filter housing.

Reference: Refer to Operation and Maintenance Manual, “Engine Air Filter Primary Element - Clean/Replace”.

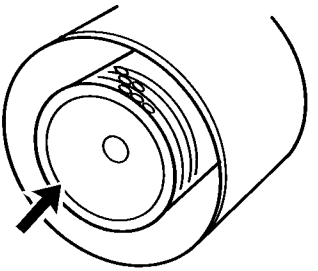


Illustration 156 g00882913

4. Clean the inside of the air filter housing. Then, remove the secondary element from the air filter housing.

5. Install a new secondary element.

Note: A secondary element should never be cleaned. Always install a new secondary element filter.

6. Install a clean primary element.

7. Install cover (1).

8. Make sure that the air filter housing is secure.

9. Close the engine access panel.

i02212237

Engine Air Filter Service Indicator - Inspect

SMCS Code: 7452

NOTICE
Service the air cleaner only with the engine stopped. Engine damage could result.

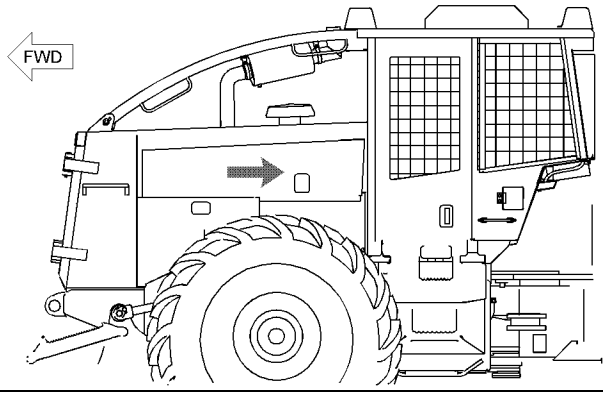


Illustration 157 g01095177

1. Open the engine access door on the LH side of the machine. The air filter service indicator (1) is located in the engine compartment on the LH side of the machine.

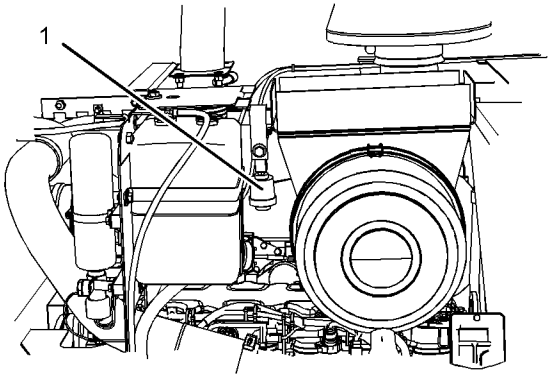


Illustration 158 g01116980

2. If the yellow piston in the air filter service indicator (1) enters the red zone, service the air cleaner.

3. Check the condition of the air filter service indicator. If the air filter service indicator is damaged, then replace the air filter service indicator.

4. Close the engine access door.

i02212375

Engine Air Filter Service Indicator - Inspect/Replace

SMCS Code: 7452-040; 7452-510

The air filter service indicator is an important inexpensive instrument. The indicator is used to show air filter restriction. The indicator can help prevent unnecessary servicing. The indicator can also help avoid running the engine with an excessively plugged air filter. The air filter service indicator should be the method for determining the filter's life. A dirty filter can still maintain the required performance. Only, proper use of the air filter service indicator can determine if the filter can maintain the required performance.

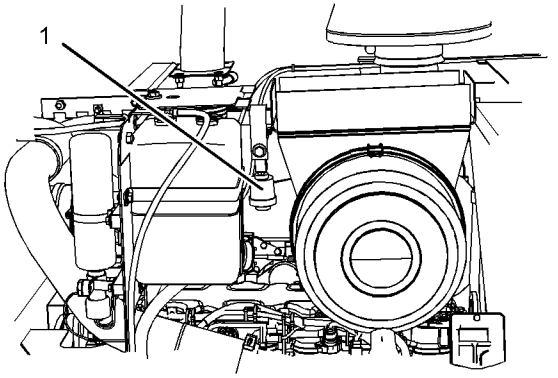


Illustration 159 g01116980

The air filter service indicator (1) is located in the engine compartment on the LH side of the machine.

In normal dust conditions, the air filter service indicator should be tested for proper operation at 250 hours. Also, the indicator should be tested when the air filter elements are serviced. In order to check the operation of the air filter service indicator, do the following checks.

- Stop the engine. Check for ease of resetting the indicator. The indicator should reset within a maximum of three pushes.

- Check for movement of the yellow core when the engine is accelerated to high idle. When the engine is accelerated to high idle, the yellow core should latch near the highest position.

If the indicator will not easily reset replace the indicator. When the engine is accelerated to high idle and the indicator does not latch at the highest position, replace the indicator.

i03238081

Engine Air Precleaner - Clean (If Equipped)

SMCS Code: 1055-070

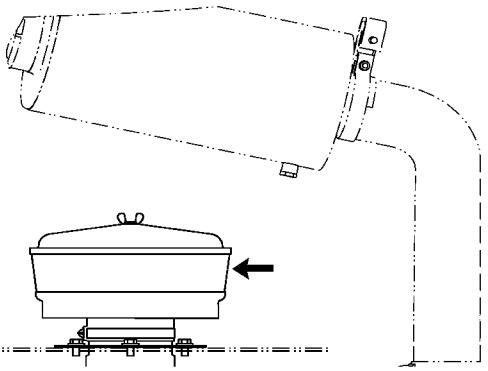


Illustration 160 g01645019

The engine air precleaner is located on the top of the engine enclosure. Empty the precleaner bowl whenever the dirt reaches the “FULL” mark.

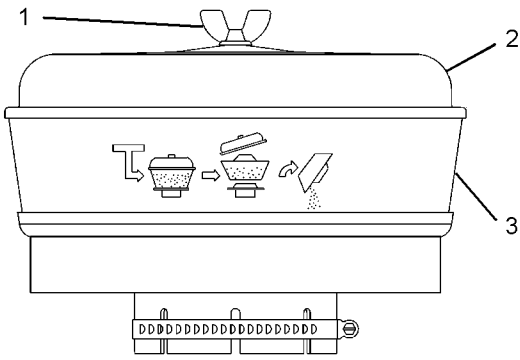


Illustration 161 g01645093

1. Loosen wing nut (1) on cover (2). Remove the cover.

2. Empty precleaner bowl (3). Wash the precleaner bowl and the cover with water.

3. Install precleaner bowl (3) and cover (2). Tighten wing nut (1) finger tight.

i02164487

Engine Crankcase Breather - Clean

SMCS Code: 1317

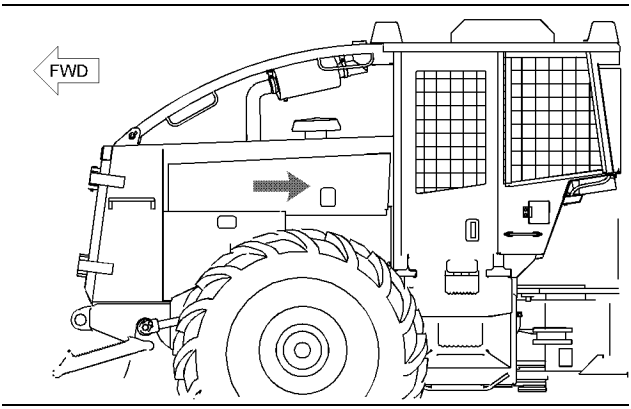


Illustration 162 g01095177

1. Open the access panel on the left side of the machine.

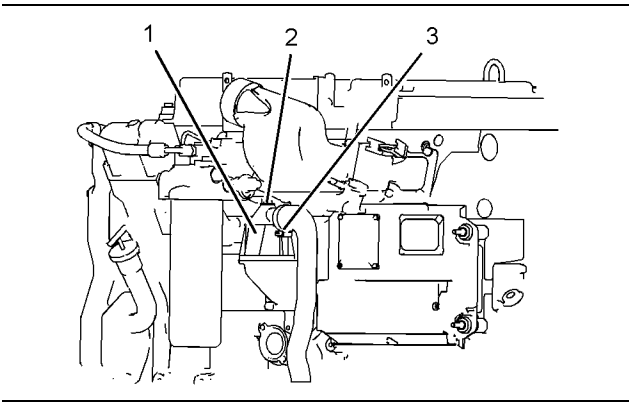


Illustration 163 g01097860

2. Loosen breather outlet hose clamp (3) and remove the hose from breather cover (1).

3. Remove bolt (2) that holds the breather assembly onto breather cover (1). Remove the breather.

4. Check the condition of the cover seal. Replace the seal if the seal is damaged.

5. Wash the breather cover and the element in a clean, nonflammable solvent. Shake the element dry or use pressure air.

6. Inspect the hose. Replace the hose if the hose is damaged.

7. Install the breather assembly, breather cover (1) and bolt (2).

8. Install the hose and breather outlet hose clamp (3).

9. Close the engine access panel.

i02145934

Engine Oil Level - Check

SMCS Code: 1000-535-FLV

NOTICE
Do not under fill or overfill engine crankcase with oil. Either condition can cause engine damage.

1. Open the engine access door on the left side of the machine.

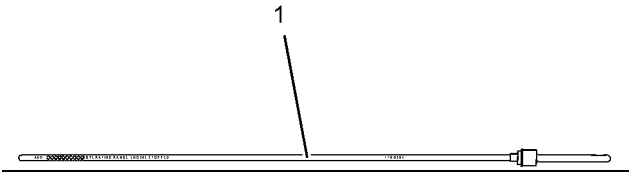


Illustration 164 g01089197

2. Maintain the engine oil within the marks on the correct side of oil level dipstick (1). Check the oil level while the engine is stopped.

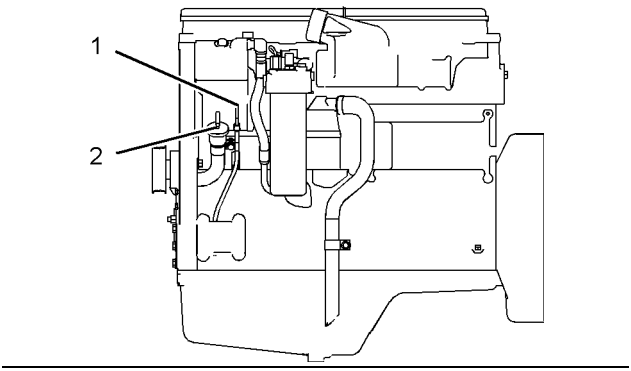


Illustration 165 g01089198

3. Add oil through oil filler tube (2), if necessary.

4. Close the engine access door.

i02127839

Engine Oil Sample - Obtain

SMCS Code: 1348-008; 7542

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

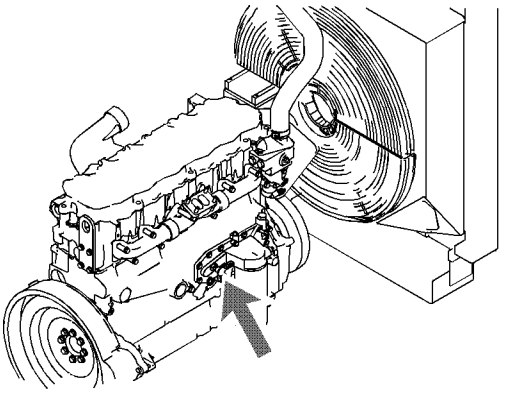


Illustration 166 g01095579

Operate the machine for a few minutes before you obtain the fluid sample. This will thoroughly mix the fluid for a more accurate sample.

The sampling valve for the engine oil is located on the right side of the engine on the engine oil filter base.

Reference: For more information, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” and Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

i02340757

Engine Oil and Filter - Change

SMCS Code: 1318-510

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

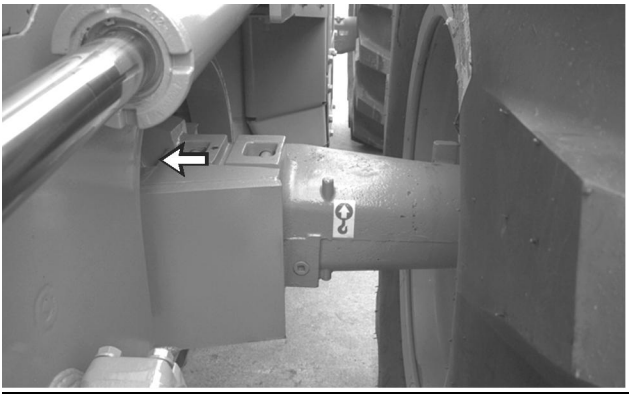


Illustration 167 g00698957

535C and 545C

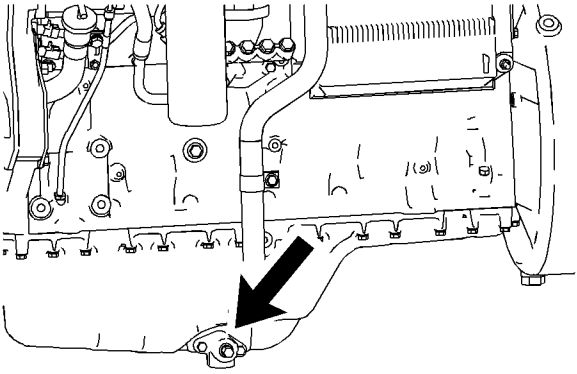


Illustration 168 g01096085
535C and 545C

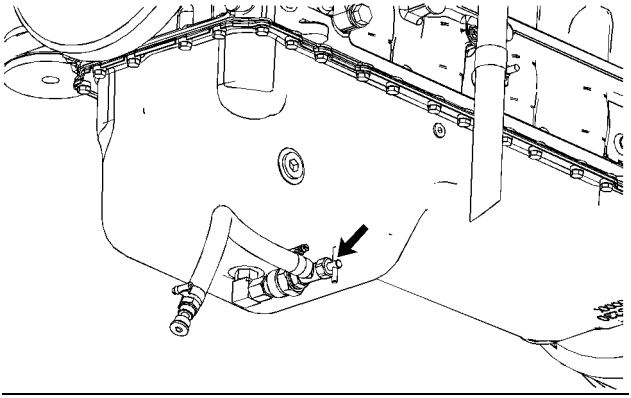


Illustration 169 g01207506
525C

The drain valve is located on the left side of the machine.

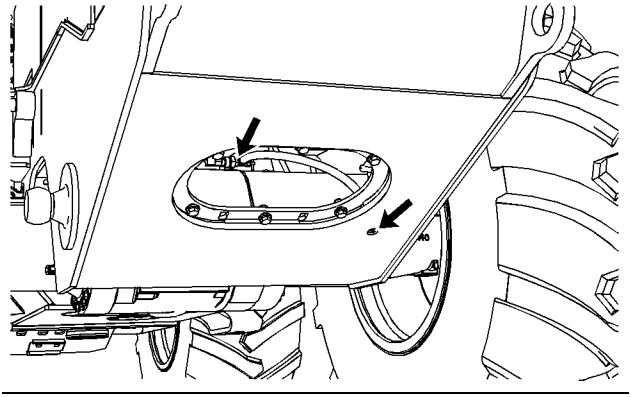


Illustration 170 g01230416

525C

1. Remove the plug from the drain valve in order to drain the oil from the engine.

2. Attach an elbow and hose to the drain valve. Open the drain valve and allow the oil to drain into a suitable container.

3. Close the drain valve. Remove the elbow and the hose from the drain valve.

4. Clean the plug and reinstall the plug in the drain valve.

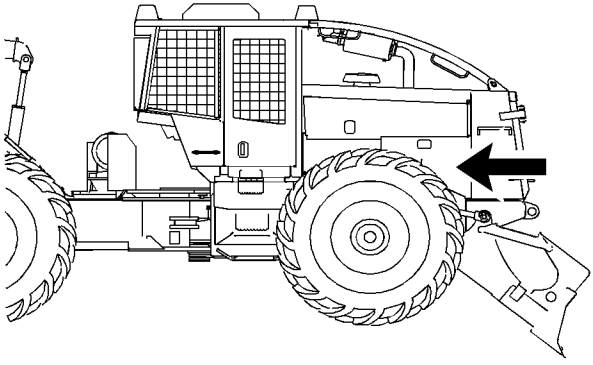


Illustration 171 g01096517

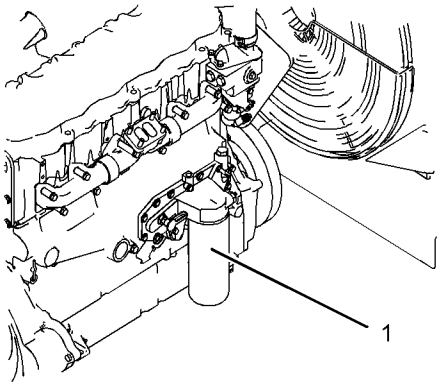


Illustration 172 g01095949

5. Open the front access door on the right side of the machine. Use a strap type wrench to remove engine oil filter (1).

6. Clean the housing base. Make sure that the used gasket is completely removed.

7. Apply a light coat of clean engine oil to the new gasket that is provided with the new filter.

Note: There are rotation index marks on each engine oil filter that are spaced 90 degrees or 1/4 of a turn from each other. When you tighten engine oil filters, use the rotation marks as a guide.

8. Install the engine oil filter hand tight until the seal contacts the base.

Note: Note the position of the index marks on the filter in relation to a fixed point on the filter base.

9. Tighten the filter according to the instructions that are printed on the filter. Use the index marks as a guide.

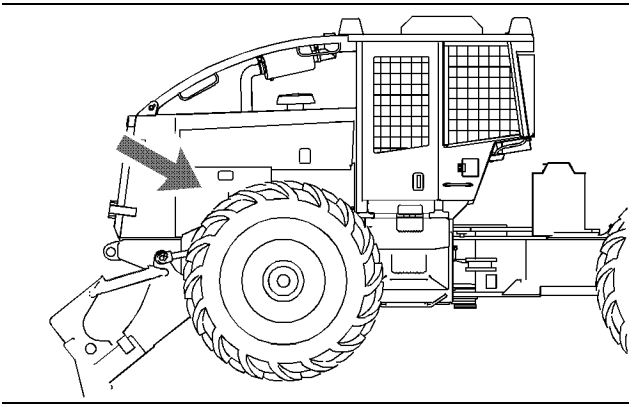


Illustration 173 g01095976

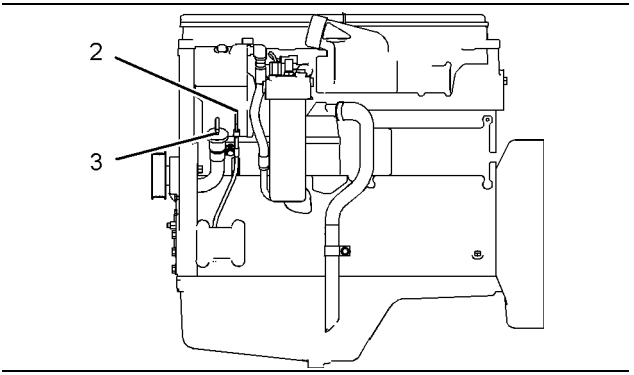


Illustration 174 g01095975

10. Open the engine access door on the left side of the machine. Fill the crankcase with oil through oil filler tube (3).

Reference: Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the proper amount of oil.

11. Start the engine and allow the oil to circulate. Check for leaks.

12. Check the engine oil level with oil dipstick (2).

Reference: Refer to Operation and Maintenance Manual, “Engine Oil Level - Check” for the correct procedure.

13. If the oil level is correct, close the engine access doors.

i04538255

Engine Valve Lash - Check

SMCS Code: 1105-535

In order to perform the valve lash adjustment, refer to Systems Operation, Testing and Adjusting, “Engine Valve Lash - Inspect/Adjust”.

Note: A qualified mechanic should adjust the engine valve lash because special tools and training are required.

i02391361

Ether Starting Aid Cylinder - Replace (If Equipped)

SMCS Code: 1456-510-CD

⚠ WARNING

Breathing ether vapors or repeated contact of ether with skin can cause personal injury. Personal injury may occur from failure to adhere to the following procedures.

Use ether only in well ventilated areas.

Do not smoke while changing ether cylinders.

Use ether with care to avoid fires.

Do not store replacement ether cylinders in living areas or in the operator's compartment.

Do not store ether cylinders in direct sunlight or at temperatures above 49 °C (120 °F).

Discard cylinders in a safe place. Do not puncture or burn cylinders.

Keep ether cylinders out of the reach of unauthorized personnel.

To avoid possible injury, be sure the brakes are applied and all controls are in Hold or Neutral when starting the engine.

NOTICE

Do not manually apply the ether into the intake. The heating element will incur damage if ether is sprayed directly into the intake.

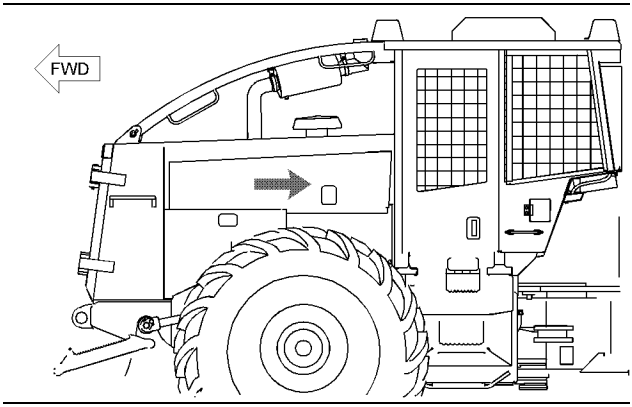


Illustration 175 g01095177

1. Open the access panel on the left side of the engine enclosure.

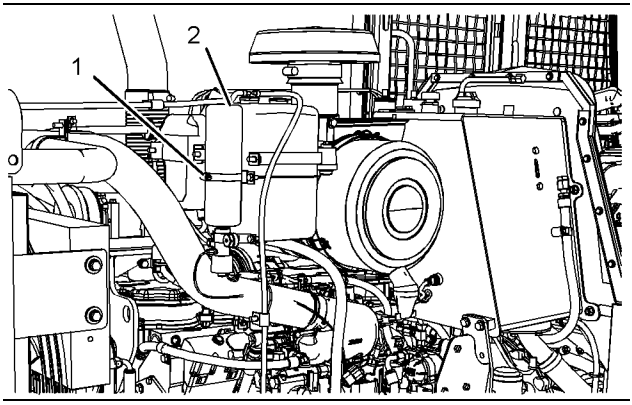


Illustration 176 g01225878

2. Loosen cylinder retaining clamp (1). Unscrew ether starting aid cylinder (2).

3. Remove the ether starting aid cylinder and the used gasket. Install the new gasket that is provided with the new ether starting aid cylinder.

4. Install the new ether starting aid cylinder. Tighten the ether starting aid cylinder and the cylinder retaining clamp by hand.

5. Install the access panel.

i02755946

Fairlead Rollers - Lubricate

SMCS Code: 6306-086

Wipe off all fittings before any lubricant is applied.

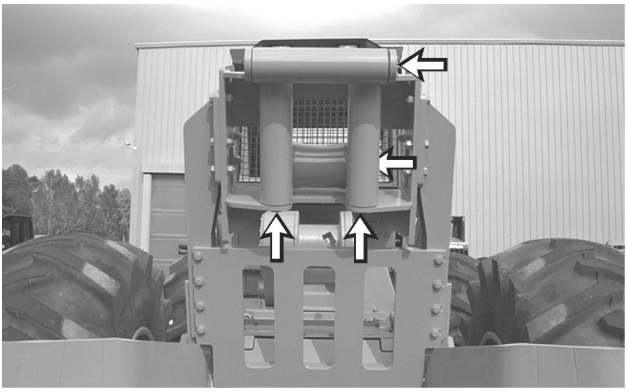


Illustration 177 g00586884

On the cable skidder, apply lubricant through the fitting on the end of each fairlead roller. There is a total of four fittings.

i02456550

Fuel System - Prime

SMCS Code: 1258-548

1. Turn the engine start switch to the ON position. Leave the engine start switch in the ON position for two minutes.

2. Attempt to start the engine. If the engine starts and the engine runs rough or the engine misfires, operate at low idle until the engine is running smoothly. If the engine cannot be started, or if the engine continues to misfire or smoke, repeat step 1.

Note: The electric fuel pump turns on when the key is turned on. There is not a separate priming pump.

i02217093

Fuel System Primary Filter (Water Separator) - Drain

SMCS Code: 1263-543

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

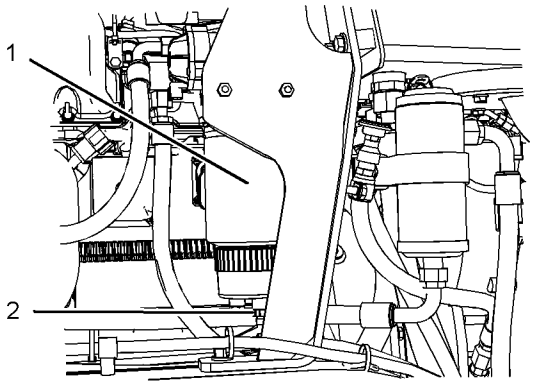


Illustration 178 g01118968

1. Open the engine access door on the left side of the machine. The primary fuel filter and water separator (1) is located on the left side of the machine.

2. Loosen drain valve (2) on the bottom of the water separator bowl. Allow the water and the sediment to drain into a suitable container.

3. Tighten drain valve (2).

Note: The water separator is under suction during normal engine operation. Tightening the drain valve prevents air leakage into the fuel system.

4. If the engine fails to start or if there is a power loss, change the fuel filter.

Reference: Refer to Operation and Maintenance Manual, “Fuel System Primary Filter (Water Separator) Element - Replace” for the correct procedure.

5. Close the engine access door.

i02217164

Fuel System Primary Filter (Water Separator) Element - Replace

SMCS Code: 1260-510; 1263-510-FQ

WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not fill fuel filters with fuel before installing them. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts. The fuel system should be primed prior to starting the engine.

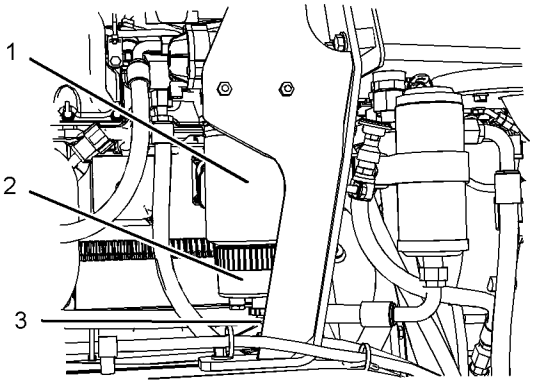


Illustration 179 g01119024

1. Open the engine access door on the left side of the machine. The primary fuel filter (1) is a spin-on type filter.

2. Install a hose or a tube onto drain valve (3). Open drain valve (3) on the bottom of water separator bowl (2). Allow the water and the fuel to drain into a suitable container.

3. Close drain valve (3). Remove the tube or the hose from the drain valve.

4. Remove primary fuel filter (1) from the filter base.

5. Remove water separator bowl (2) from primary fuel filter (1). Inspect the fuel filter element for debris by cutting the filter open. Discard the used fuel filter element properly. Clean water separator bowl (2).

Note: The water separator bowl is reusable. Do not discard water separator bowl (2).

6. Inspect the gasket on water separator bowl (2). Replace the gasket, if necessary.

7. Lubricate the gasket with clean diesel fuel or with engine oil. Place the gasket in water separator bowl (2).

8. Install water separator bowl (2) onto the new primary fuel filter (1) by hand until water separator bowl (2) is snug. Do not use tools to tighten water separator bowl (2).

Note: Remove the cap from the new primary fuel filter before you install the water separator bowl. Discard the cap.

9. Clean the filter mounting base. Make sure that all of the used seal is removed from the filter mounting base.

10. Apply a thin coat of diesel fuel or engine oil to the seal on new primary fuel filter (1).

11. Install the new fuel filter by hand. When the seal contacts the filter base, tighten primary fuel filter (1) by an additional 3/4 turn. This will tighten primary fuel filter (1) sufficiently. Do not use tools to tighten primary fuel filter (1).

12. Prime the fuel system in order to fill the water separator element with fuel.

    Reference: Refer to Operation and Maintenance Manual, “Fuel System - Prime” for the correct procedure.

13. Close the engine access door.

i02252246

Fuel System Secondary Filter - Replace

SMCS Code: 1261-510-SE

⚠ WARNING

Personal injury or death can result from a fire.

Fuel leaked or spilled onto hot surfaces or electrical components can cause a fire.

Clean up all leaked or spilled fuel. Do not smoke while working on the fuel system.

Turn the disconnect switch OFF or disconnect the battery when changing fuel filters.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

NOTICE

Do not fill fuel filters with fuel before installing them. The fuel will not be filtered and could be contaminated. Contaminated fuel will cause accelerated wear to fuel system parts. The fuel system should be primed prior to starting the engine.

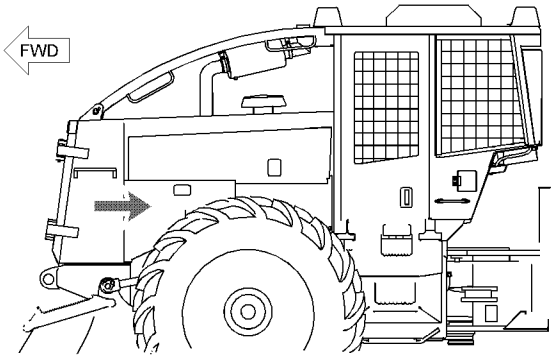


Illustration 180 g01098027

1. Open the left front engine access door. The secondary fuel filter is located on the left side of the engine.

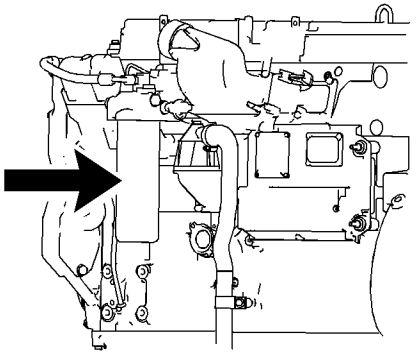


Illustration 181 g01099064

2. Use a strap type wrench to remove the secondary fuel filter.

3. Clean the filter mounting base. Make sure that all of the used seal is completely removed.

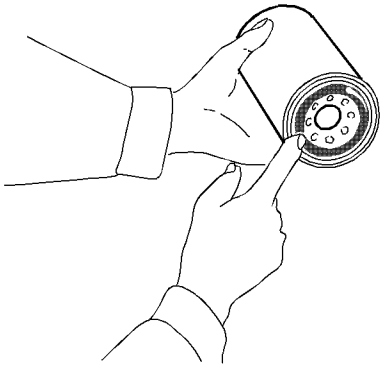


Illustration 182 g01099018

4. Install the new filter element by hand. After the gasket contacts the filter mounting base, tighten the filter elements by an additional 3/4 turn.

5. Prime the fuel system.

   Reference: Refer to Operation and Maintenance Manual, “Fuel System - Prime” for the correct procedure.

6. Close the engine access door.

i02145893

Fuel Tank Cap and Strainer - Clean

SMCS Code: 1273-070-Z2; 1273-070-STR

The fuel tank cap is located on the right side of the machine.

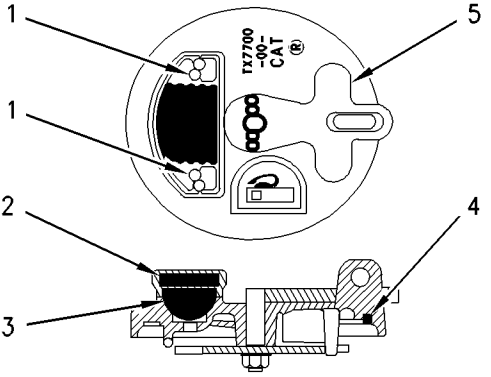


Illustration 183 g00702968

1. Lift lever (5) and turn the lever counterclockwise until the lever stops. Lift the cap straight up in order to remove the cap.
2. Inspect seal (4) for damage. Replace the seal, if necessary.
3. Remove screws (1), filter assembly (2), valve (3) and the gaskets.
4. Wash the fuel tank cap in a clean, nonflammable solvent.
5. Install the new cap filter kit. Install the components in reverse order.
6. Remove the strainer from the tank filler opening. Wash the strainer in a clean, nonflammable solvent. Install the strainer.
7. Install the fuel tank cap.

i01408020

Fuel Tank Water and Sediment - Drain

SMCS Code: 1273-543-M&S

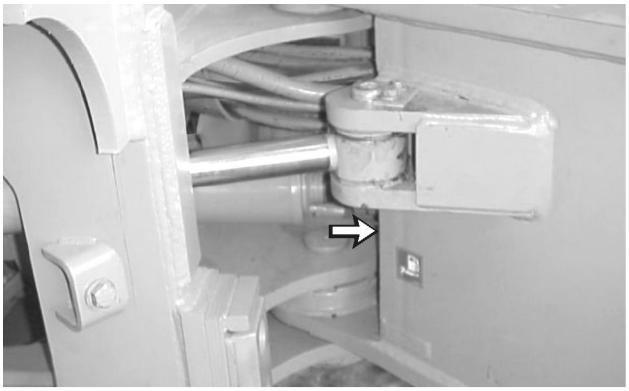


Illustration 184 g00741044

The fuel tank drain valve is located in the articulation joint near the drive shaft.

Note: For better access, turn the machine all the way to the right.

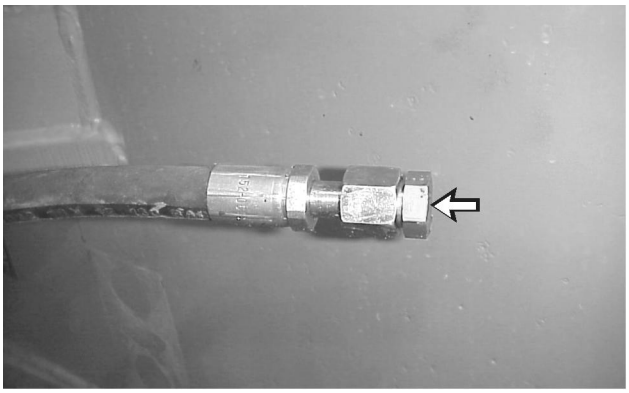


Illustration 185 g00587858

1. Pull the attached hose out of the opening in the hitch. Remove the plug from the end of the hose.

Illustration 186 g00585242

2. Open the drain valve. Allow the water and the sediment to drain into a suitable container for disposal.

3. Close the drain valve. Install the plug in the end of the hose and place the hose back into the rear frame.

i02206402

Fuses - Replace

SMCS Code: 1417-510

NOTICE
Always replace fuses with the same type and capacity fuse that was removed. Otherwise, electrical damage could result.

Fuses – Fuses protect the electrical system from damage that is caused by overloaded circuits. Replace the fuse if the element separates. If the element of a new fuse separates, check the circuit. Repair the circuit, if necessary.

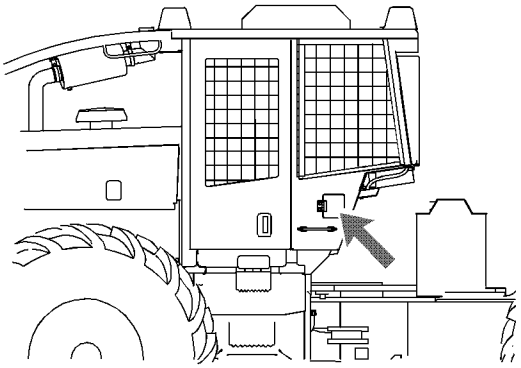


Illustration 187 g01097733

The fuse panel is located on the left side of the cab.

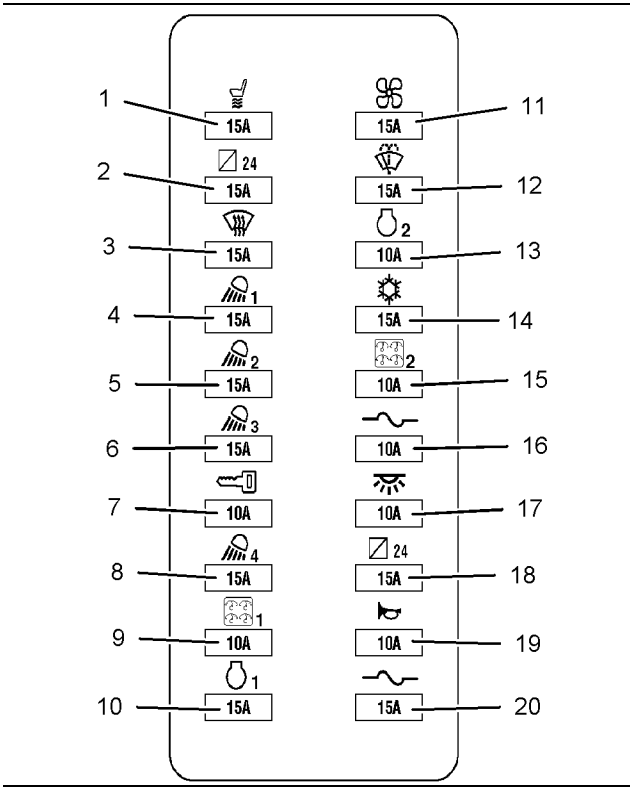


Illustration 188 g01099172

(1) Seat Adjustment (Height) – 15 Amp

(2) Voltage Converter (24 Volt Power Source) – 15 Amp

(3) Defroster Fan – 15 Amp

(4) Rear Grapple Lights – 15 Amp

(5) Front Working Lights – 15 Amp

(6) Rear Working Lights – 15 Amp

(7) Engine Start Switch – 10 Amp

(8) Flood Lamp – 15 Amp

(9) Electronic Gauges – 10 Amp

(10) Engine – 15 Amp

(11) Fan Motor – 15 Amp

(12) Front Window Wiper and Washer – 15 Amp

(13) Engine – 10 Amp

(14) Transmission – 15 Amp

(15) Electronic Gauges – 10 Amp

(16) Spare Fuse – 10 Amp

(17) Interior Lights – 10 Amp

(18) Voltage Converter (24 Volt Power Source) – 15 Amp

(19) Horn – 10 Amp

(20) Spare Fuse – 15 Amp

i02461972

Grapple Boom and Arch (Dual Function) - Lubricate

SMCS Code: 6302-086; 6308-086

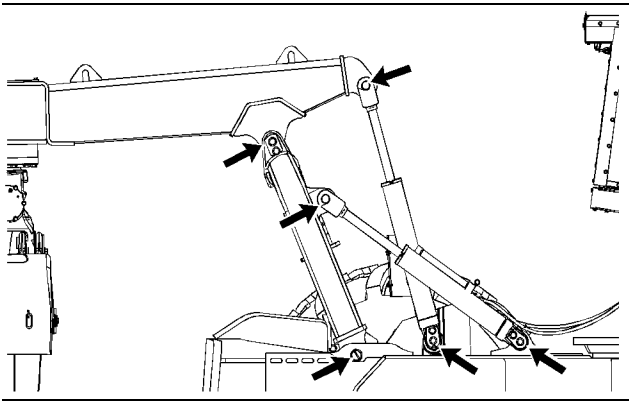


Illustration 189 g01228503

Wipe off the fittings before you apply any lubricant.

Apply lubricant through six fittings on each side of the grapple arch. There is a total of twelve fittings.

i02462104

Grapple Boom and Arch (Single Function) - Lubricate

SMCS Code: 6302-086; 6308-086

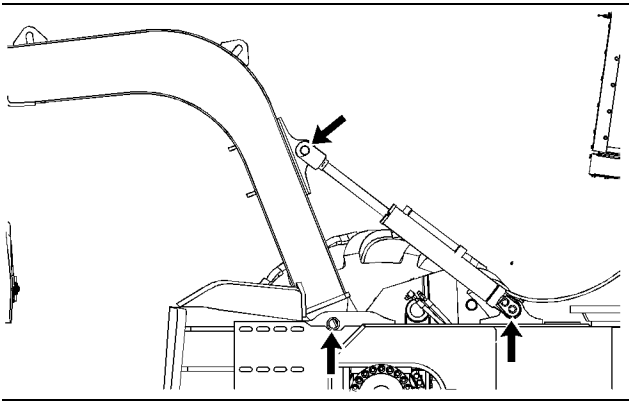


Illustration 190 g01228518

Wipe off the fittings before you apply any lubricant.

Apply lubricant through three fittings on each side of the grapple arch. There is a total of six fittings.

i02462202

Grapple Head (Bunching) - Lubricate

SMCS Code: 6307-086

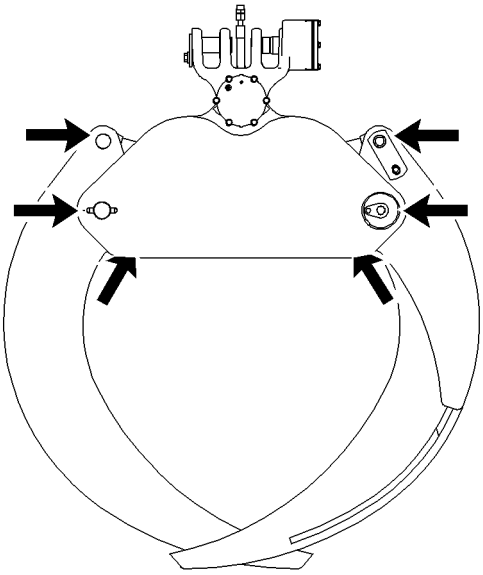


Illustration 191 g00954439

Wipe off the fittings before you apply any lubricant.

Apply lubricant through seven fittings on the grapple head.

i01906178

Grapple Head (Continuous Rotation) - Lubricate

SMCS Code: 6307-086

S/N: 5351-Up

S/N: 5451-Up

Wipe off the fittings before you apply any lubricant.

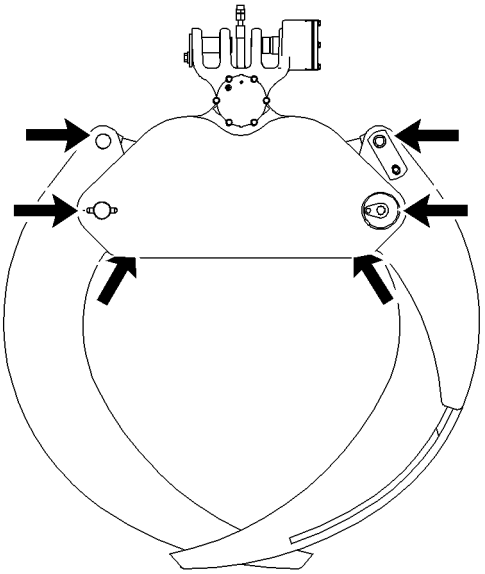


Illustration 192 g00954439

Apply lubricant through six fittings on the grapple head.

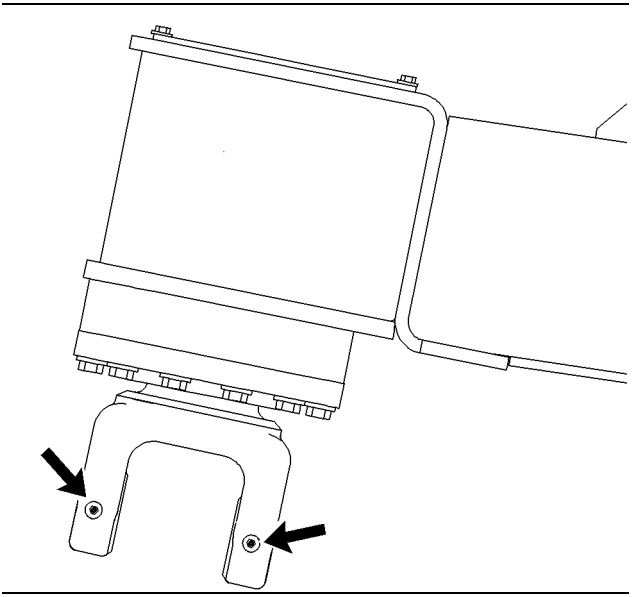


Illustration 193 g00956334
Grapple Rotator

Apply lubricant through two fittings on the grapple rotator.

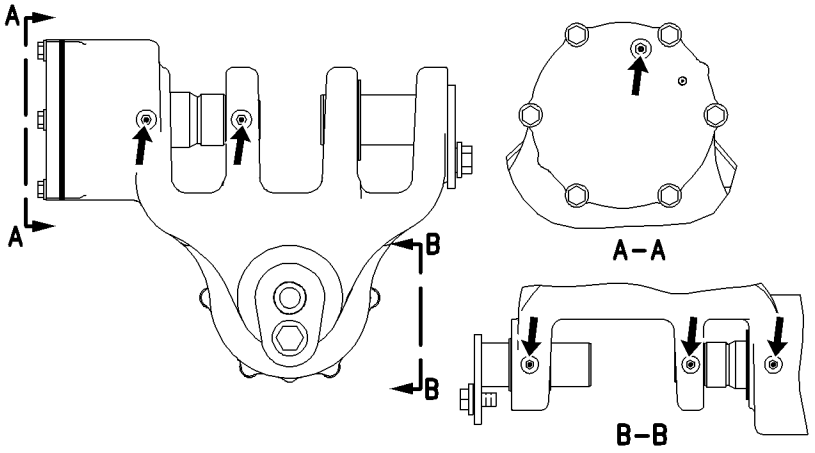


Illustration 194
g00992708

Grapple Snubber

Apply 5P-0960 Molybdenum Grease through seven fittings on the grapple snubber.

Note: Apply 5P-0960 Molybdenum Grease to the clutch housing until grease comes out of the reversed grease zerk.

i02462227

Grapple Head (Sorting) - Lubricate

SMCS Code: 6307-086

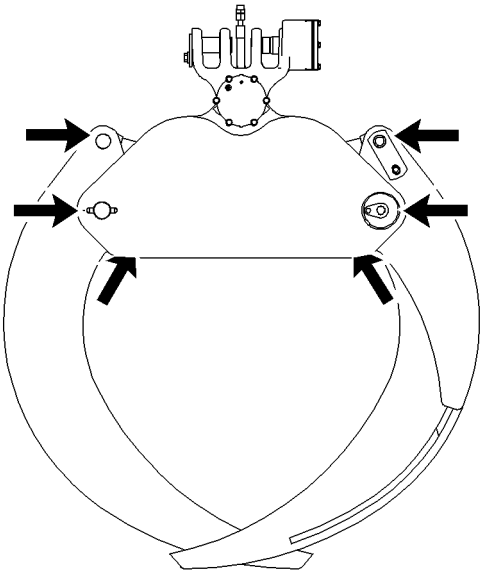


Illustration 195 g00954439

Wipe off the fittings before you apply any lubricant.

Apply lubricant through seven fittings on the grapple head.

i01878169

Grapple Head Rotator (Continuous Rotation) - Lubricate

SMCS Code: 6307-086

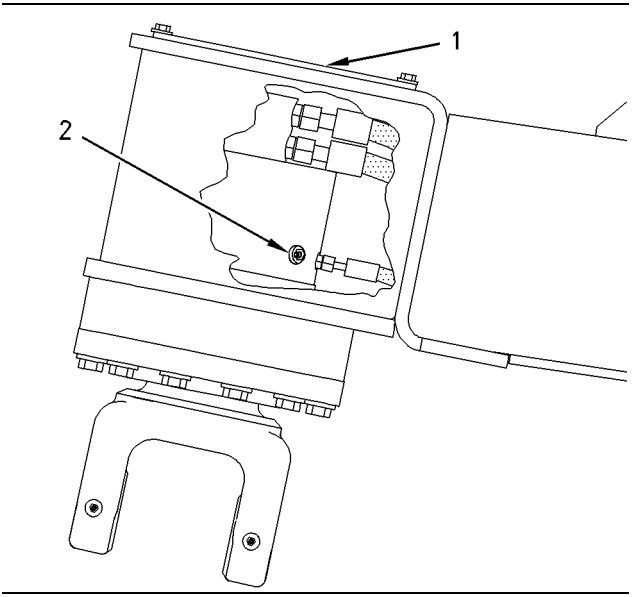


Illustration 196 g00955879

Wipe off the fittings before you apply any lubricant.

Remove cover plate (1) in order to access fitting (2). Fill the rotator with lubricant through fitting (2).

i01906192

Grapple Snubber - Inspect/Adjust

SMCS Code: 6307-025; 6307-040

WARNING

If the swing dampener (snubber) is not properly tightened, the grapple can swing freely. This could cause personal injury to nearby personnel.

Make sure that the area around the grapple is clear of personnel before you check the swing dampener (snubber).

In order to achieve the longest life of the components for the snubber, the operation of the snubber should be monitored constantly. The adjustment should be tight enough to avoid damaging contact with the arch or the boom while the grapple arms (tongs) are empty.

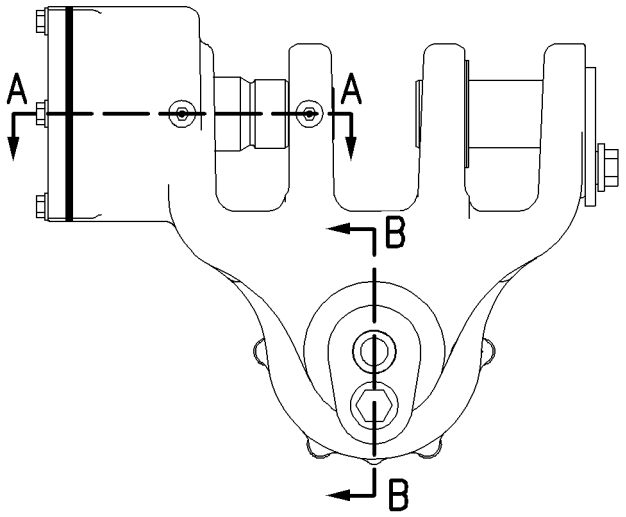
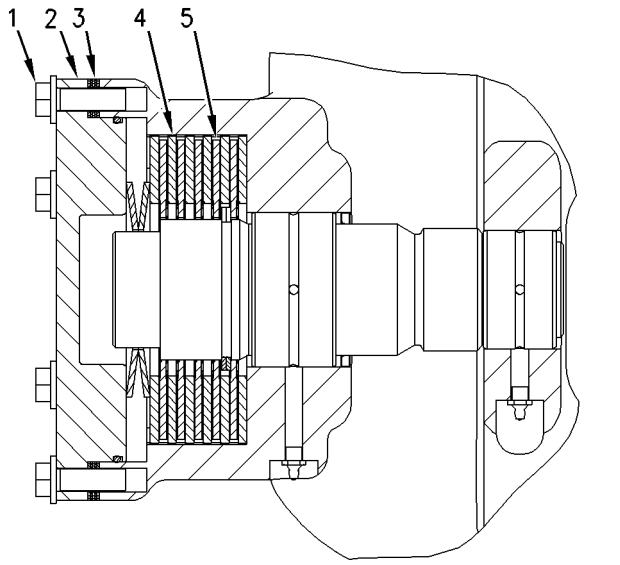


Illustration 197 g00956113



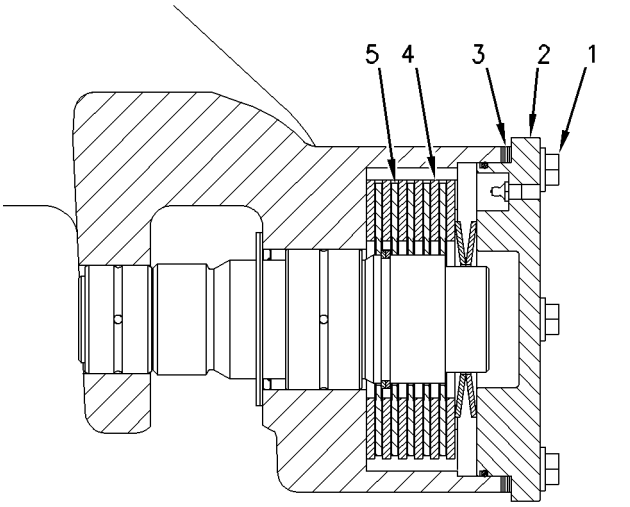
g00956038

Illustration 198

View A-A

Upper Joint Assembly

(1) Bolt
(2) Cap
(3) Shims
(4) Reaction plate
(5) Friction plate



g00956037

Illustration 199

View B-B

Lower Joint Assembly

(1) Bolt
(2) Cap
(3) Shims
(4) Reaction plate
(5) Friction plate

The amount of drag of the snubber is set with shims (3). In order to increase the drag of the snubber, remove shims. In order to decrease drag of the snubber, add shims.

1. To adjust the snubber, loosen bolts (1) from cap (2).

Note: Each shim goes halfway around cap (2). Therefore, the shims are removed in pairs. The machine is shipped with 5 shim thicknesses.

2. Add or remove shims until the desired swing of the grapple is achieved.

Use the shims, as needed.

(3) 203-3956 Shim ..... 1.21 mm (.048 inch)

3. Replace the reaction plates and the friction plates if the drag of the snubber is not high enough.

Installation Procedure

Upper Joint Assembly

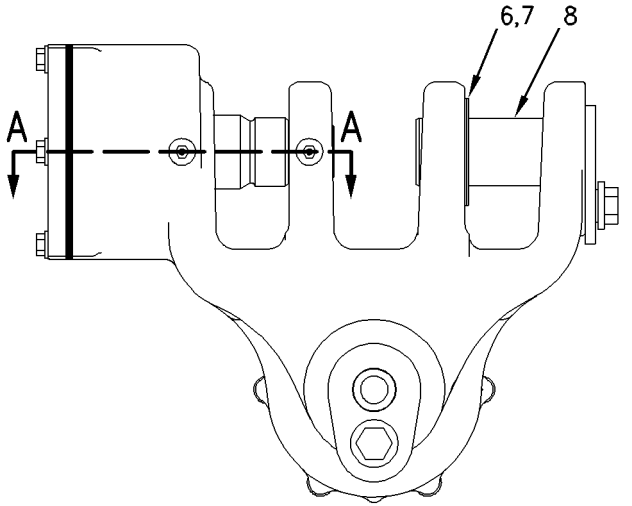


Illustration 200 g00956218

(6) 204-9606 Shim
(7) 204-9607 Shim
(8) Pin

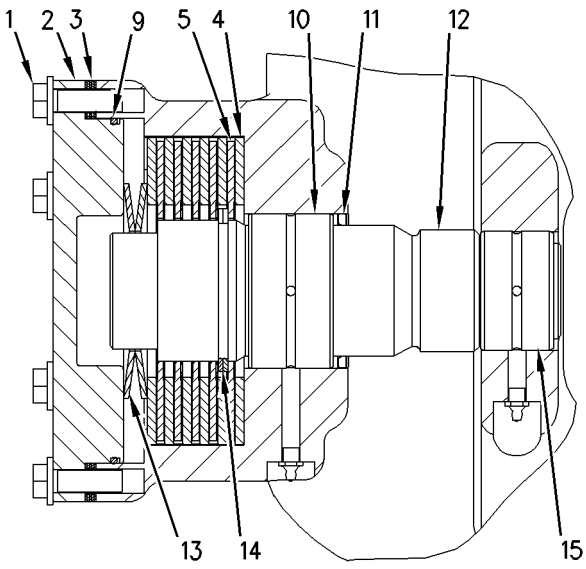


Illustration 201 g00956219

View A-A

(1) Bolt
(2) Cap
(3) 203-3956 Shim
(4) Reaction plate
(5) Friction plate
(9) O-ring seal
(10) Bushing
(11) Lip seal
(12) Pin
(13) Spring
(14) Retaining ring
(15) Bushing

1. Install one reaction plate (4) and one friction plate (5).

Note: All friction plates should be dipped in 8T-9579 Oil for five minutes before assembly.

Note: A total of five friction plates are required for proper operation.

2. Insert the pin (12) with retaining ring (14) until the retaining ring touches the first friction plate (5).

3. Install the rest of the parts.

Note: Install cap (2) with the reversed grease zerk at the top.

4. Retract the pin (8) far enough in order to slide shims (6,7) between the lug edge and the clevis end. Insert the shims and assemble pin (8).

Use the shims, as needed.

(6) 204-9606 Shim ..... 2.29 mm (.090 inch)
(7) 204-9607 Shim ..... 1.52 mm (.060 inch)

5. Apply 5P-0960 Molybdenum Grease on the bearings and the clutch housing through the grease fittings that are on the bearing. Apply the grease to the clutch housing until grease comes out of the reversed grease zerk.

6. Repeat Step 5 again after one hour of operation after the initial fill.

Lower Joint Assembly

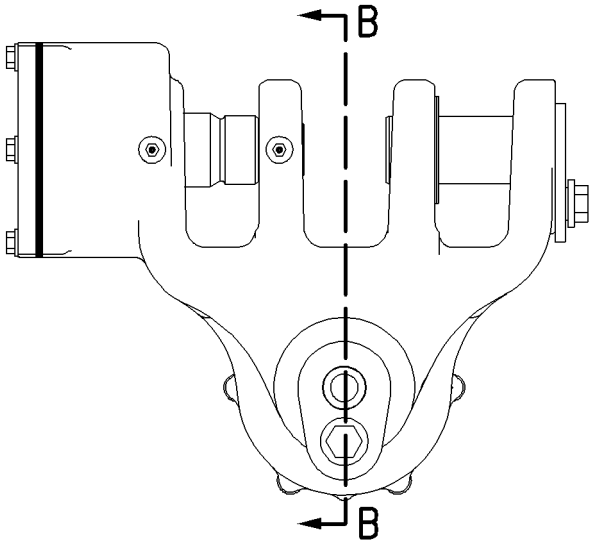


Illustration 202 g00956278

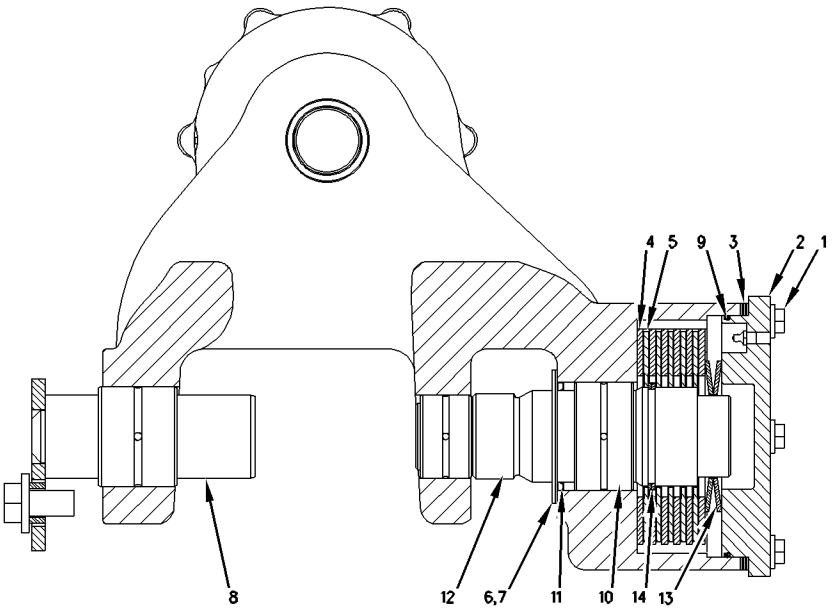


Illustration 203 g00992715

View B-B

(1) Bolt
(2) Cap
(3) 203-3956 Shim
(4) Reaction plate
(5) Friction plate
(6) 204-9606 Shim
(7) 204-9607 Shim
(8) Pin
(9) O-ring seal
(10) Bushing
(11) Lip seal
(12) Pin
(13) Spring
(14) Retaining ring

1. Install pin (8).

2. Install one reaction plate (4) and one friction plate (5).

Note: All friction plates should be dipped in 8T-9579 Oil for five minutes before assembly.

Note: A total of five friction plates are required for proper operation.

3. Insert the pin (12) with retaining ring (14) to the back of the clutch housing.

4. Insert shims (6,7) at the back of the clutch housing lug and pass pin (12) through the shims until retaining ring (14) touches the first friction plate (5).

Use the shims, as needed.

(6) 204-9606 Shim ..... 2.29 mm (.090 inch)
(7) 204-9607 Shim ..... 1.52 mm (.060 inch)

5. Install the rest of the parts.

Note: Install cap (2) with the reversed grease zerk at the top.

6. Apply 5P-0960 Molybdenum Grease on the bearings and the clutch housing through the grease fittings that are on the bearing. Apply the grease to the clutch housing until grease comes out of the reversed grease zerk.

7. Repeat Step 6 again after one hour of operation after the initial fill.

i02156191

Hydraulic System Oil - Change

SMCS Code: 5056-044

WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

When you change the hydraulic oil, be sure to clean the cover for the filter and the hydraulic filler cap, before you remove these items. Be sure to plug or cap any lines or hoses that are disconnected. This will prevent foreign material from contaminating the hydraulic system.

Note: The hydraulic tank supplies oil to the decking blade, to the grapple, to the differential lock, to the brakes and to the steering system.

1. Operate the machine in order to warm the oil. Then, park the machine on a level surface.

2. Move the transmission direction switch to the NEUTRAL position.

3. Lower all attachments to the ground. Apply the parking brake and stop the engine.

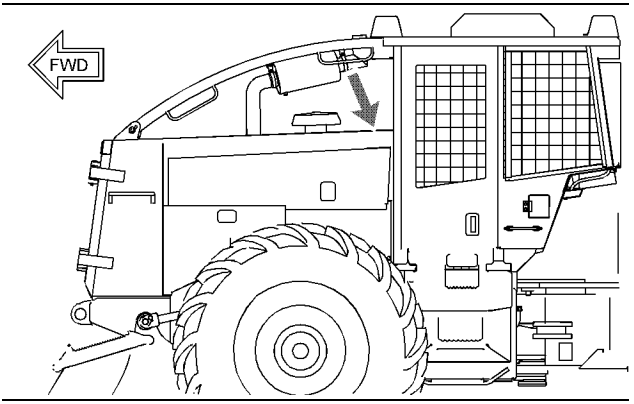


Illustration 204 g01093673

4. Open the access door on the top of the engine enclosure.

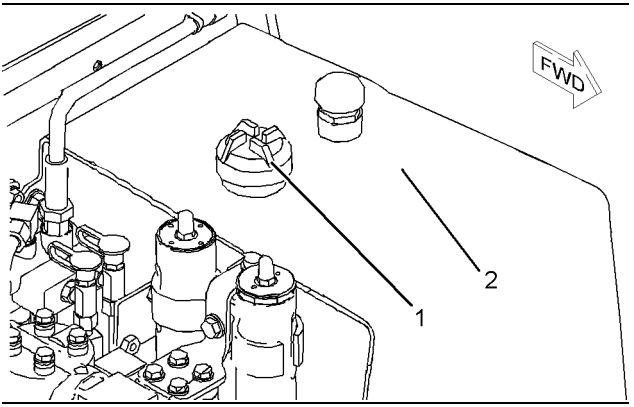


Illustration 205 g01093664

5. Slowly loosen the hydraulic tank filler cap (1) in order to release the pressure from the hydraulic tank (2).

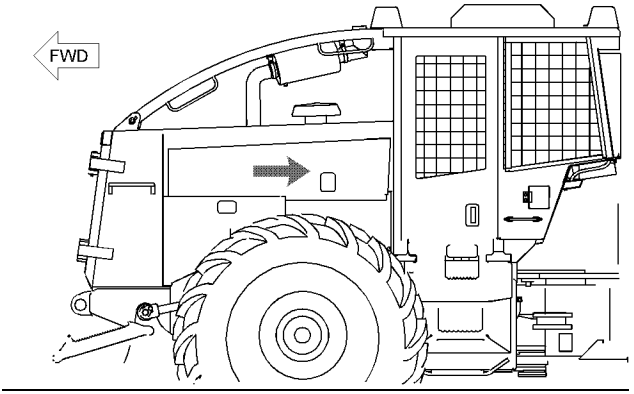


Illustration 206 g01095177

6. Open the access door on the left side of the engine enclosure.

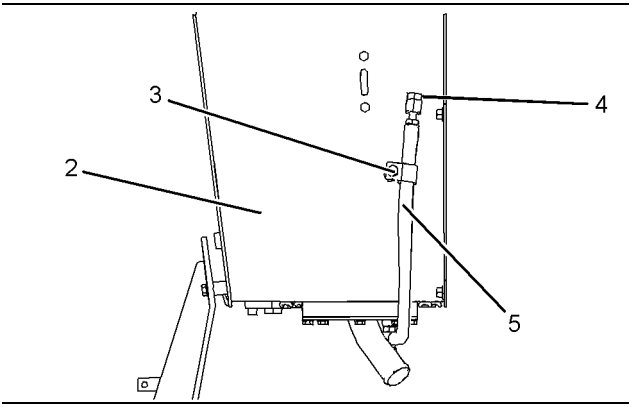


Illustration 207 g01093612

7. Remove the bolt and the retainer (3) so that hose (5) can be moved.

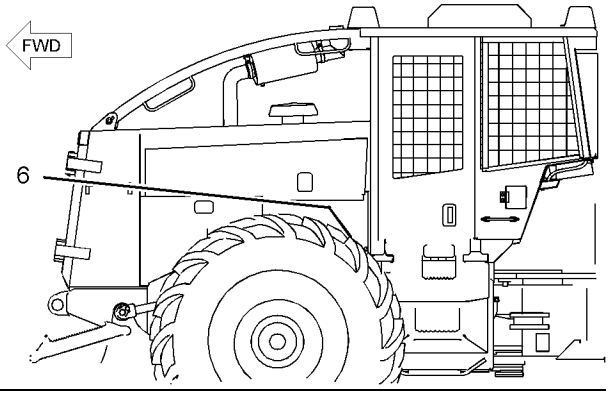


Illustration 208 g01095187

8. Route hose (5) through door (6).

9. Remove plug (4) from hose (5).

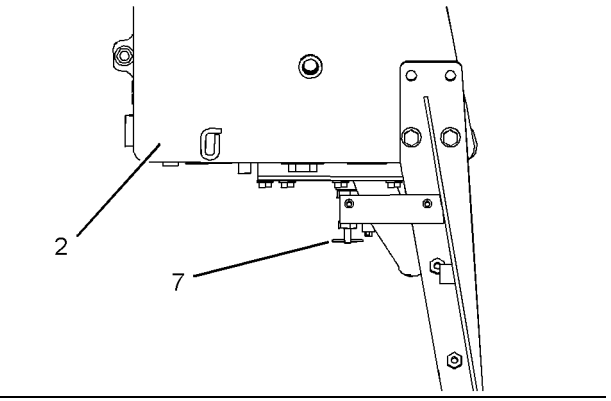


Illustration 209 g01093617

10. Open drain valve (7). Allow the oil to drain into a suitable container.

11. Close drain valve (7).

12. Install plug (4) into hose (5).

13. Return hose (5) to the original position and install the bolt and the retainer (3).

14. Replace the hydraulic oil filters.

Reference: Refer to Operation and Maintenance Manual, “Hydraulic System Oil Filter - Replace” for the correct procedure.

15. Remove the strainer from the hydraulic oil filler tube. Clean the strainer and install the strainer.

16. Fill the hydraulic tank with oil.

Reference: Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the correct amount of oil.

17. Inspect the filler cap gasket. If the gasket is damaged, replace the gasket.

18. Install the hydraulic tank filler cap.

19. Start the engine and check for leaks. Check the hydraulic oil level.

Reference: Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check” for the correct procedure.

Note: The oil must be free of bubbles. If bubbles are present in the oil, air is entering the hydraulic system. Inspect the suction line for leaks.

i02156638

Hydraulic System Oil Filter - Replace

SMCS Code: 5056-510-FI; 5068-510

⚠ WARNING

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

When you change the hydraulic filters, be sure to clean the cover for the filter and the hydraulic filler cap, before you remove these items. Be sure to plug or cap any lines or hoses that are disconnected. This will prevent foreign material from contaminating the hydraulic system.

1. Park the machine on a level surface. Lower all attachments to the ground. Move the transmission direction switch to the NEUTRAL position. Apply the parking brake and stop the engine.

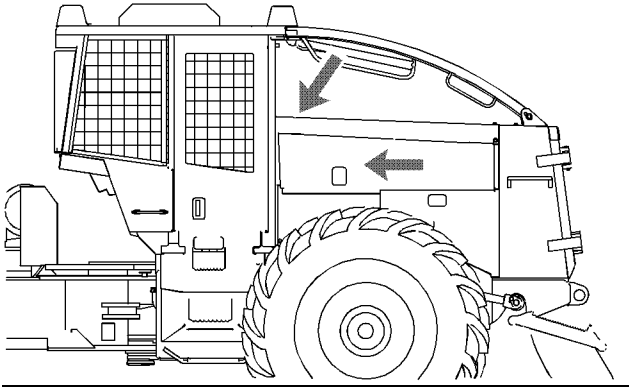


Illustration 210 g01094632

2. Open the access door on the top of the engine enclosure and open the access door on the right side of the engine enclosure.

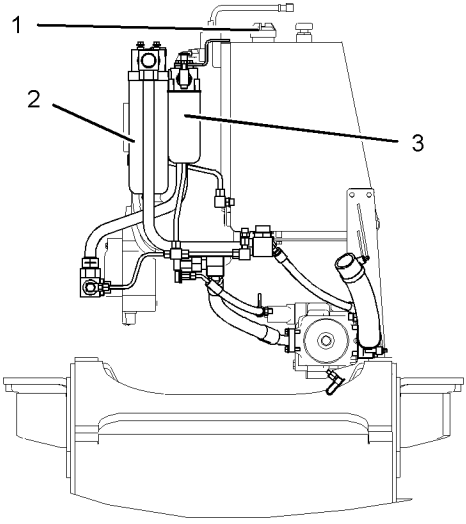


Illustration 211 g01095207

3. Slowly loosen hydraulic tank filler cap (1) in order to release the pressure from the tank.

4. Use an oil filter strap wrench to remove the hydraulic oil filters (2) and (3). Dispose of the used filters properly.

5. Clean both of the filter bases. Make sure that all of the used gaskets are removed.

6. Apply a light coat of clean hydraulic oil on the new gaskets.

7. Install the new hydraulic oil filters (2) and (3). When the filter contacts the filter base, tighten the filter by an additional 3/4 turn.

8. Tighten hydraulic tank filler cap (1).

9. Start the engine and operate the brakes, the steering and the attachments. Check the hydraulic oil level.

   Reference: Refer to Operation and Maintenance Manual, “Hydraulic System Oil Level - Check” for the correct procedure.

10. Inspect the filters for leaks.

11. Close the access doors.

i02392258

Hydraulic System Oil Level - Check

SMCS Code: 5056-535-FLV

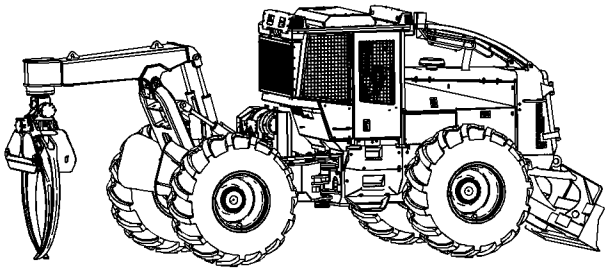


Illustration 212 g01196941

1. Lower the decking blade to the ground. Move the grapple tongs together so the tips of the grapple touch each other. Lower the grapple to the ground. This position is critical in order to obtain a proper reading of the hydraulic oil level. Cable machines have only a decking blade that is hydraulic. Therefore, the decking blade is the only component that must be on the ground.

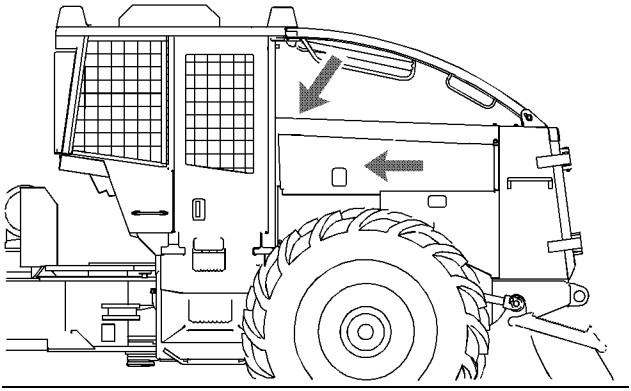


Illustration 213 g01094632

2. Open the access door on the top of the engine enclosure and open the access door on the right side of the engine enclosure.

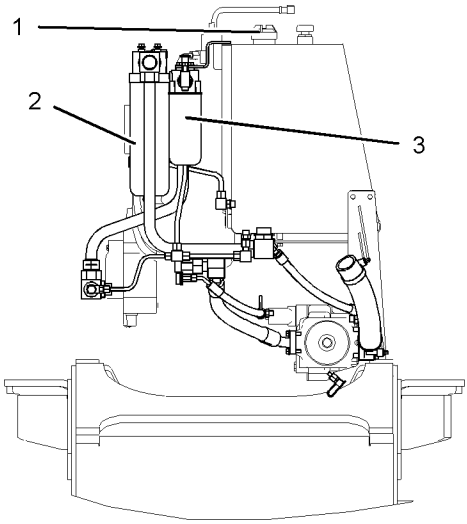


Illustration 214 g01095207

3. Slowly loosen the hydraulic filler cap (1) in order to release the pressure from the tank.

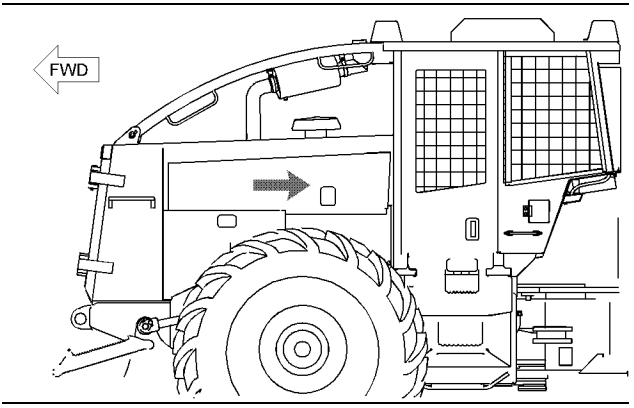


Illustration 215 g01095177

4. Open the access door on the left side of the machine.

5. Check the oil level sight gauge. The oil level should be visible through the sight gauge.

6. If the oil level is low, open the access door on the top of the engine enclosure.

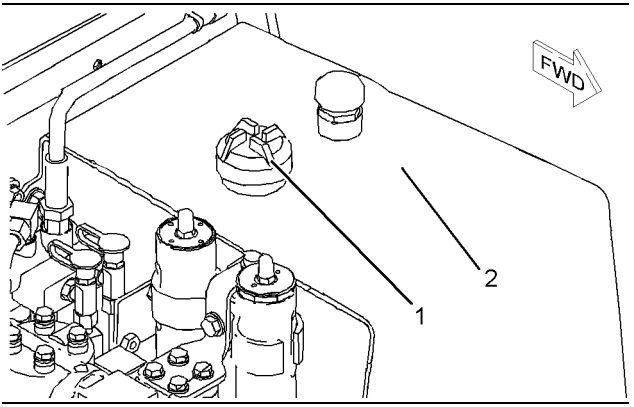


Illustration 216 g01093664

7. Slowly loosen the hydraulic cap (1) in order to release the pressure from the tank (2).

8. Remove the hydraulic tank filler cap and add oil, if necessary.

9. Clean the filler cap and install the filler cap. Close the access door.

i02127840

Hydraulic System Oil Sample - Obtain

SMCS Code: 5050-008; 5056-008; 7542

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the machine for a few minutes before you obtain the fluid sample. This will thoroughly mix the fluid for a more accurate sample.

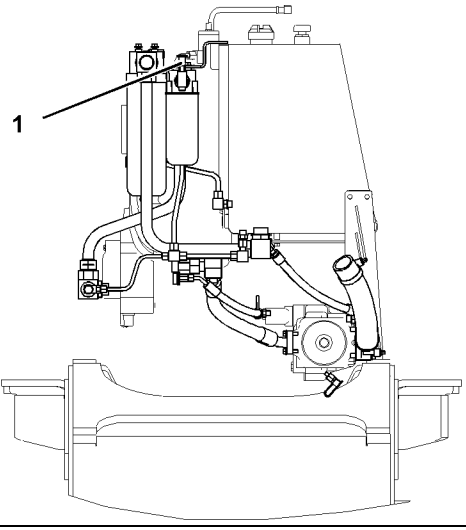


Illustration 217 g01088315

The hydraulic system is equipped with a sampling valve. The sampling valve (1) is located on the base of the hydraulic oil filter.

Reference: For more information, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” and Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

i02156875

Hydraulic Tank Breaker Relief Valve - Clean

SMCS Code: 5118-070

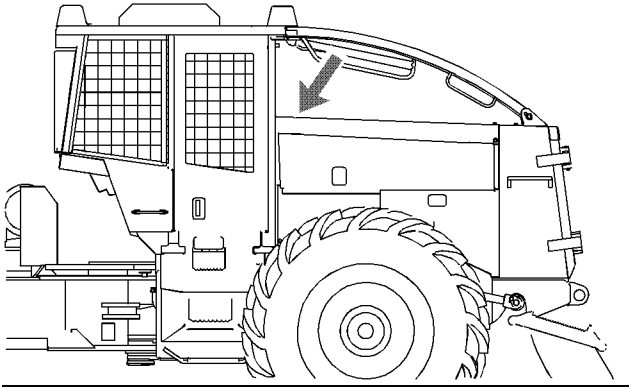


Illustration 218 g01094645

1. Open the access door on the top of the engine enclosure.

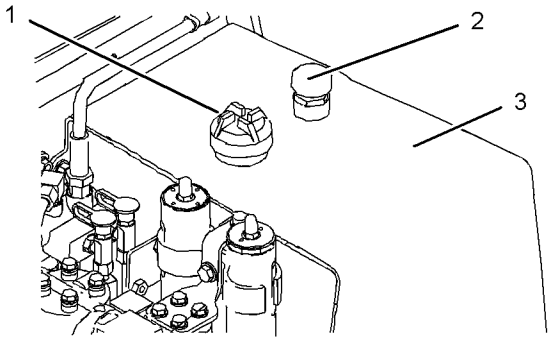


Illustration 219 g01093924

2. Slowly loosen the hydraulic tank filler cap (1) in order to relieve the pressure in the hydraulic tank (3). Tighten the hydraulic tank filler cap (1). Remove the hydraulic tank breaker relief valve (2).

3. Clean the hydraulic tank breaker relief valve (2) in a clean, nonflammable solvent. Shake the relief valve (2) dry or use pressure air.

4. Install the hydraulic tank breaker relief valve (2).

5. Close the access door.

i02161948

Oil Filter - Inspect

SMCS Code: 1308-507; 3067-507; 5068-507; 5177-507

Inspect a Used Filter for Debris

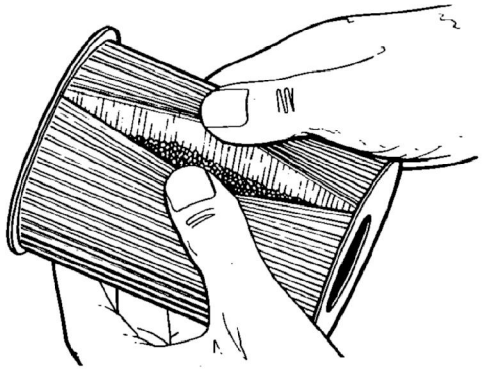


Illustration 220 g01096266

The element is shown with debris.

Use a filter cutter to cut the filter element open. Spread apart the pleats and inspect the element for metal and for other debris. An excessive amount of debris in the filter element can indicate a possible failure.

If metals are found in the filter element, a magnet can be used to differentiate between ferrous metals and nonferrous metals.

Ferrous metals can indicate wear on steel parts and on cast iron parts.

Nonferrous metals can indicate wear on the aluminum parts of the engine such as main bearings, rod bearings, or turbocharger bearings.

Small amounts of debris may be found in the filter element. This could be caused by friction and by normal wear. Consult your Caterpillar dealer in order to arrange for further analysis if an excessive amount of debris is found.

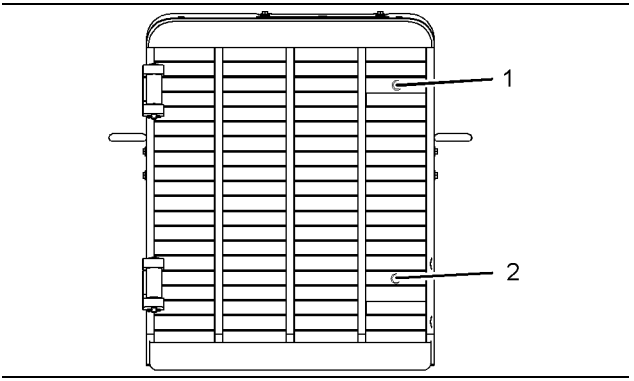
Using an oil filter element that is not recommended by Caterpillar can result in severe engine damage to engine bearings, to the crankshaft, and to other parts. This can result in larger particles in unfiltered oil. The particles could enter the lubricating system and the particles could cause damage.

i02469270

Radiator Core - Clean

SMCS Code: 1353-070-KO

Before you can clean the radiator, you must open the radiator grill. The radiator grill is hinged in two places.



g01089244

Illustration 221

Radiator Grill

1. Remove bolts (1) and (2) from the left side of the radiator grill. This will allow you to open the grill.

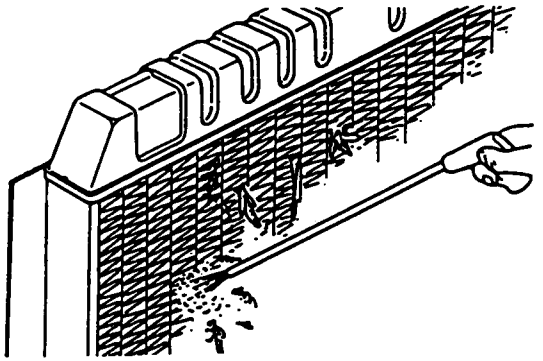


Illustration 222 g01096285

2. Use compressed air, high pressure water, or steam in order to remove dust and other debris from the radiator core. However, the use of compressed air is preferred.

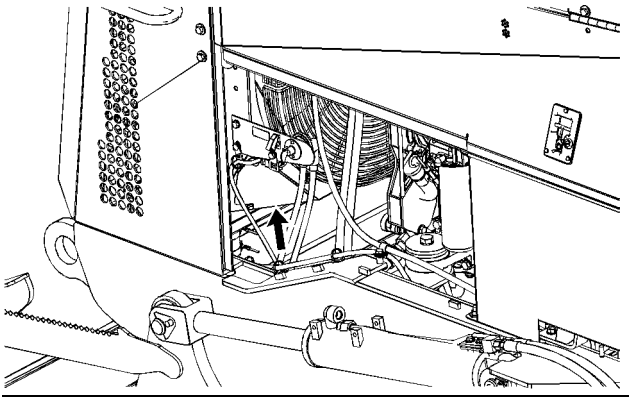


Illustration 223 g01231388

3. Remove the cover plates on the left side of the radiator and the right side of the radiator in order to expose the access hole for the radiator. The holes will allow easier access in order to clean the radiator.

Reference: For more information on cleaning the radiator core, refer to Special Publication, SEBD0518, “Know Your Cooling System”.

i01701441

Refrigerant Accumulator (With Desiccant) - Replace

SMCS Code: 7322-510-DSS

Reference: For the correct procedure, refer to Air Conditioning and Heating Service Manual, SENR5664 or the Disassembly and Assembly Manual for your machine.

Note: A qualified mechanic should replace the components of the refrigerant system since special tooling and training are required.

i02252267

Rollover Protective Structure (ROPS) - Inspect

SMCS Code: 7323-040; 7325-040

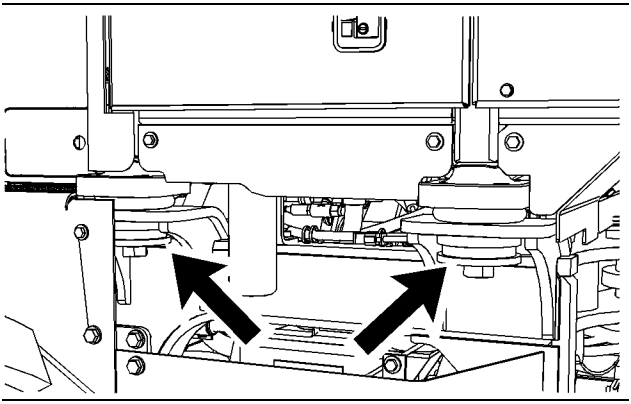


Illustration 224 g01133939

Remove the access panels from both sides of the machine. Tighten the four cab mounting bolts to a torque of 850 ± 100 N·m (625 ± 75 lb ft). Replace the mounting supports if the ROPS rattles during machine operation.

Inspect the ROPS for bolts that are loose, damaged or missing. Replace any bolts that are damaged or missing with original equipment parts only.

Note: Apply oil to all bolt threads before installation. Failure to apply oil may result in improper bolt torque.

Do not repair the ROPS by welding reinforcement plates to the ROPS. Consult your Caterpillar dealer for repair of cracks in welds, in castings, or in any metal section on the ROPS.

i02429612

Seat Belt - Inspect

SMCS Code: 7327-040

Always check the condition of the seat belt and the condition of the seat belt mounting hardware before you operate the machine. Replace any parts that are damaged or worn before you operate the machine.

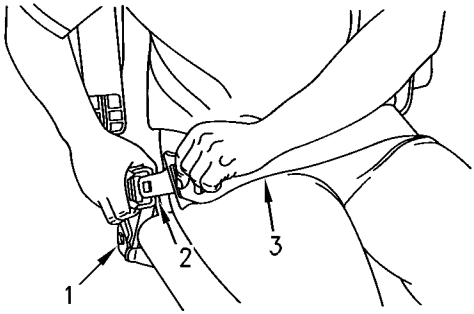


Illustration 225 g00932801

Typical example

Check the seat belt mounting hardware (1) for wear or for damage. Replace any mounting hardware that is worn or damaged. Make sure that the mounting bolts are tight.

Check buckle (2) for wear or for damage. If the buckle is worn or damaged, replace the seat belt.

Inspect the seat belt (3) for webbing that is worn or frayed. Replace the seat belt if the seat belt is worn or frayed.

Consult your authorized dealer for the replacement of the seat belt and mounting hardware.

Note: Within three years of the date of installation or within five years of the date of manufacture, replace the seat belt. Replace the seat belt at the date which occurs first. A date label for determining the age of the seat belt is attached to the seat belt, the seat belt buckle, and the seat belt retractor.

If your machine is equipped with a seat belt extension, also perform this inspection procedure for the seat belt extension.

i04421974

Seat Belt - Replace

SMCS Code: 7327-510

The seat belt should be replaced within 3 years of the date of installation. A date of installation label is attached to the seat belt retractor and buckle. If the date of installation label is missing, replace belt within 3 years from the year of manufacture as indicated on belt webbing label, buckle housing, or installation tags (non-retractable belts).

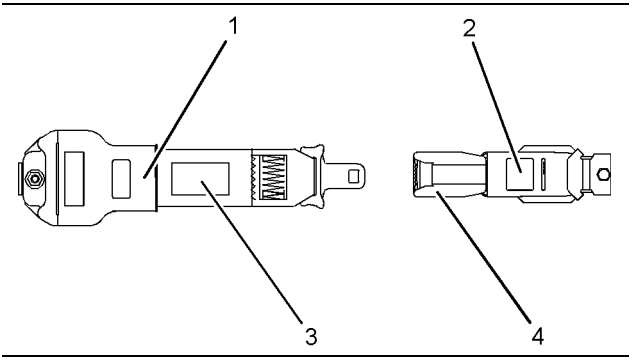


Illustration 226 g01152685

Typical Example

(1) Date of installation (retractor)
(2) Date of installation (buckle)
(3) Year of manufacture (tag) (fully extended Web)
(4) Year of manufacture (underside) (buckle)

Consult your Cat dealer for the replacement of the seat belt and the mounting hardware.

Determine age of new seat belt before installing on seat. A manufacture label is on belt webbing and imprinted on belt buckle. Do not exceed install by date on label.

Complete seat belt system should be installed with new mounting hardware.

Date of installation labels should be marked and affixed to the seat belt retractor and buckle.

Note: Date of installation labels should be permanently marked by punch (retractable belt) or stamp (non-retractable belt).

If your machine is equipped with a seat belt extension, also perform this replacement procedure for the seat belt extension.

i02468987

Secondary Steering - Test

SMCS Code: 4300-081-SE

Use the following procedure to test the secondary steering system.

1. Park the machine on a hard level surface. Lower the implements and shut off the engine. Leave the engine start switch in the ON position.

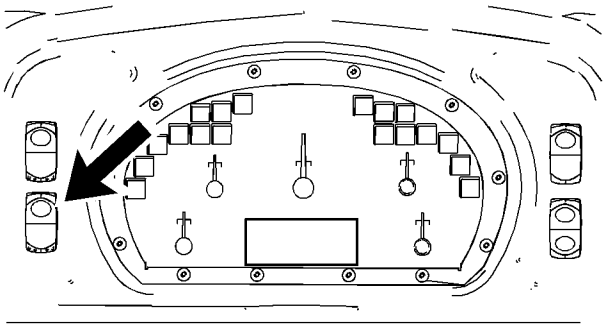


Illustration 227 g01136250

2. Press and hold the top of the test switch for the secondary steering. This will activate the secondary steering motor.

3. Turn the steering wheel fully from left to right. If the machine responds to the steering input the secondary steering is operating. If the machine does not respond to the steering input the secondary steering is not working.

4. Release the test switch for the secondary steering. Spring force will return the test switch for the secondary steering to the OFF position. This will deactivate the secondary steering motor. Do not run the secondary steering motor longer than 12 seconds while you are testing the secondary steering.

NOTICE
Do not operate the machine if the secondary steering is not operating correctly.

i02252283

Steering Cylinder Bearings - Lubricate

SMCS Code: 4303-086-BD

1. Wipe off the fittings before you apply lubricant. There is a total of four fittings.

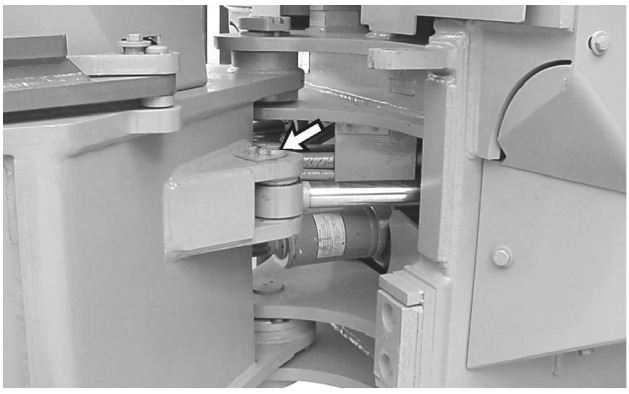


Illustration 228 g00725258

2. Apply lubricant through the fitting at the rod end of each steering cylinder.

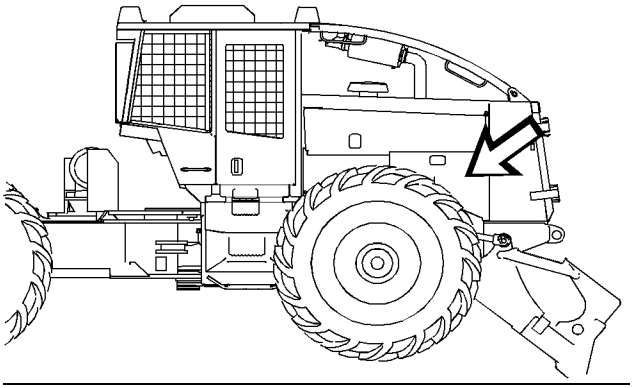


Illustration 229 g01093280

3. Open the engine access door on right side of the machine.

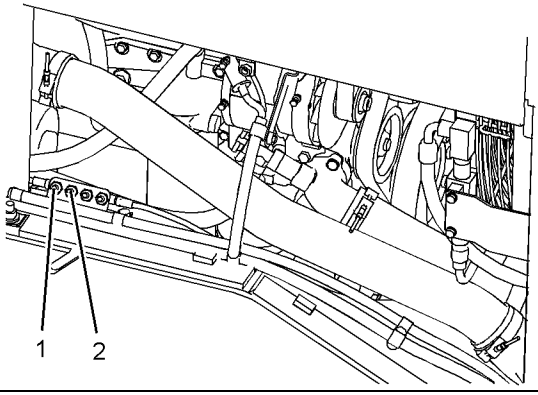


Illustration 230 g01133957

4. Apply lubricant through the remote fittings (1) and (2) for the head end of each steering cylinder.

5. Close the engine access door on right side of the machine.

i01110218

Tire Inflation - Check

SMCS Code: 4203-535-AI

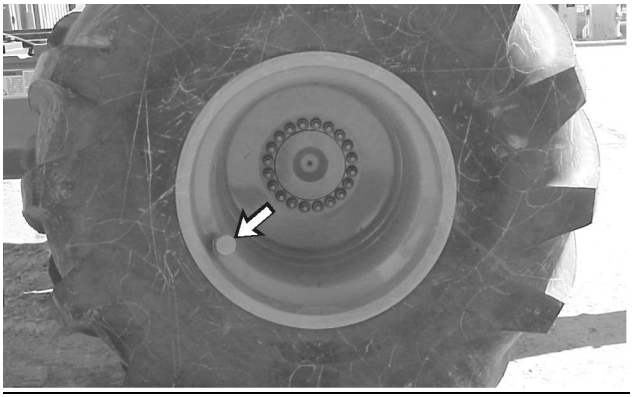


Illustration 231 g00585803

Remove the valve caps on each tire. Measure the tire pressure on each tire. Inflate the tires, if necessary.

Reference: Refer to the “Tire Inflation Information” section of the Operation and Maintenance Manual for more information or consult your Caterpillar dealer.

i02786556

Transmission Oil - Change

SMCS Code: 3030-044

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

1. Operate the engine in order to warm the oil. Park the machine on a level surface and lower the decking blade to the ground with slight down pressure.
2. Engage the parking brake. Stop the engine.
3. Remove the access plate underneath the machine.
4. Remove the transmission drain plug at the bottom of the transmission. Drain the oil into a suitable container.

Note: The transmission is equipped with an ecology drain valve.

5. Clean the drain plug and install the drain plug. Install the access plate.
6. Remove the transmission guards. The first guard weighs approximately 45 kg (95 lb). The second guard weighs approximately 20 kg (45 lb).

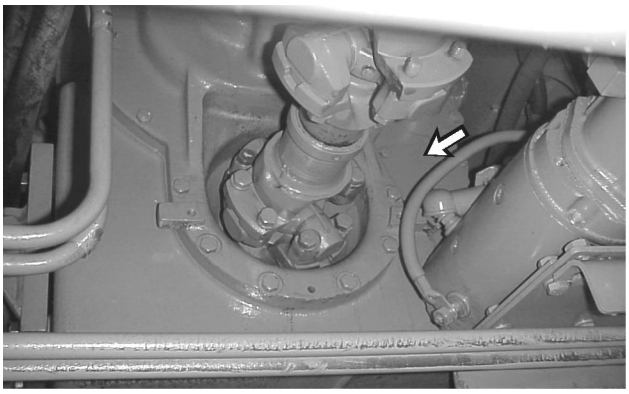


Illustration 232 g00701384

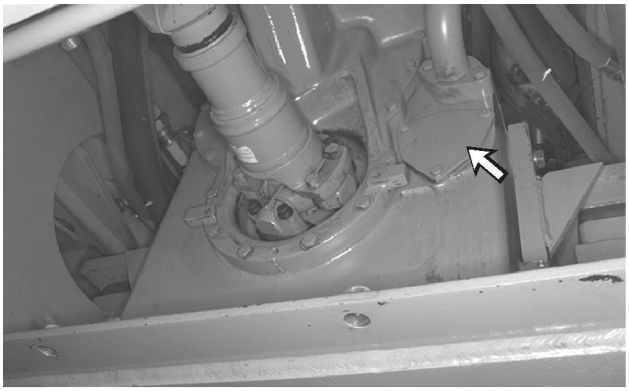


Illustration 233 g00586353

7. Remove the magnetic strainer cover.

Note: The first photo shows a machine that is equipped with a secondary steering pump and electric motor. The second photo shows a machine that is not equipped with a secondary steering pump and electric motor.

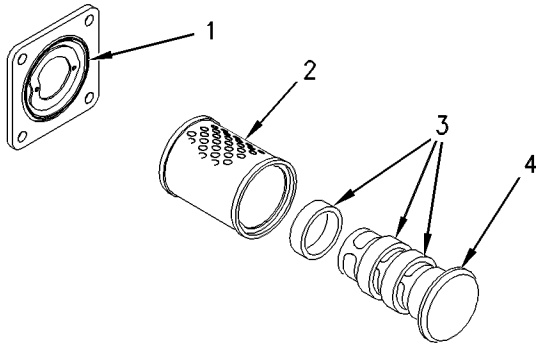


Illustration 234 g00585943

8. Remove suction screen (2) and tube (4) from the housing. Remove three magnets (3) from the tube.

9. Wash the tube and the suction screen in a clean, nonflammable solvent.

10. Use a cloth, a stiff bristle brush or pressurized air to clean the magnets.

NOTICE
Do not drop or rap the magnets against any hard objects. Replace any damaged magnets.

11. Clean the cover and inspect cover seal (1). Replace the seal, if necessary.

12. Install three magnets (3) on the tube. Insert suction screen (2) and tube (4) in the housing.

13. Install the cover and the cover bolts.

14. Replace the transmission oil filter.

Reference: Refer to Operation and Maintenance Manual, “Transmission Oil Filter - Replace” for the correct procedure.

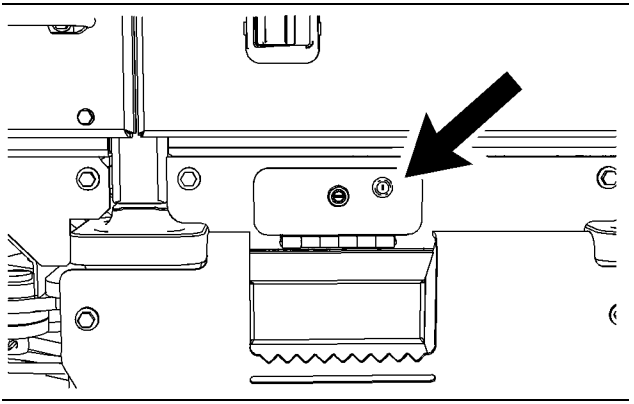


Illustration 235 g01135465

15. Open the access door on the right side of the machine.

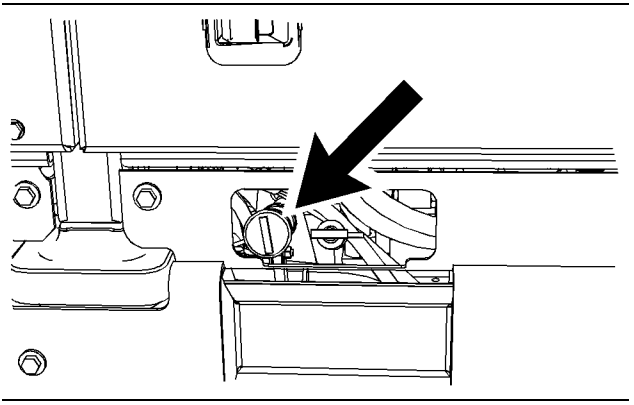


Illustration 236 g01135488

16. Pull out the extendable oil filler tube for easier access and fill the transmission with oil.

Reference: Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the correct amount.

17. Remove the transmission breather from the top of the dipstick tube. Wash the breather in a clean, nonflammable solvent. Install the breather.

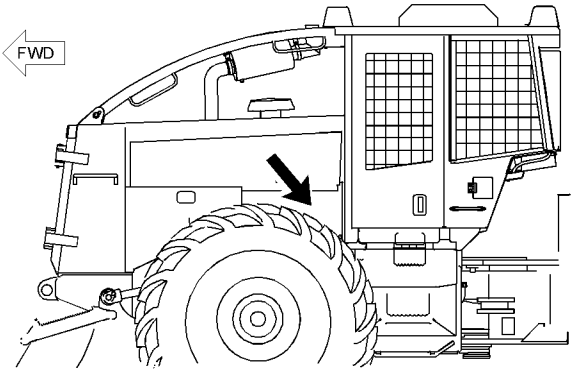


Illustration 237 g01115803

18. Open the access panel on the left side of the machine.

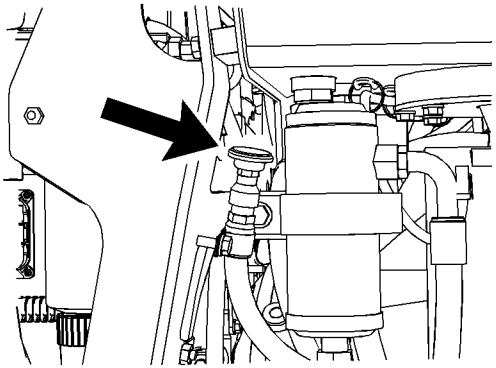


Illustration 238 g01119039

19. Remove the transfer gear housing breather. Wash the breather in a clean, nonflammable solvent. Install the breather.

Note: The photo shows a machine that is equipped with a secondary steering arrangement.

20. Start the engine and run the engine at low idle.

21. Disengage the parking brake. Apply the service brakes.

22. Move the transmission control to FORWARD and to REVERSE in order to circulate the oil.

23. Move the transmission control to the NEUTRAL position and engage the parking brake.

24. Check for leaks under the machine.

25. Check the transmission oil level.

Reference: Refer to Operation and Maintenance Manual, “Transmission Oil Level - Check” for the correct procedure.

26. If transmission oil level is low, add oil. Recheck the transmission oil level.

27. Close the access door.

28. Stop the engine.

29. Close the access panel on the left side of the machine. Install the transmission guards underneath the machine.

i02254243

Transmission Oil Filter - Replace

SMCS Code: 3004-510; 3067-510

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

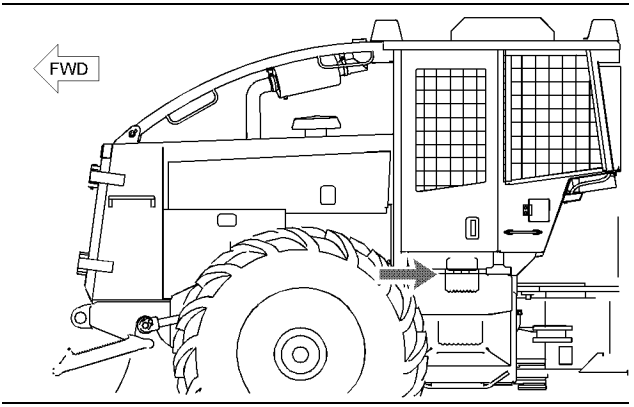


Illustration 239 g01101509

1. Stop the engine. Engage the parking brake.
2. Remove the step assembly on the left side of the machine.

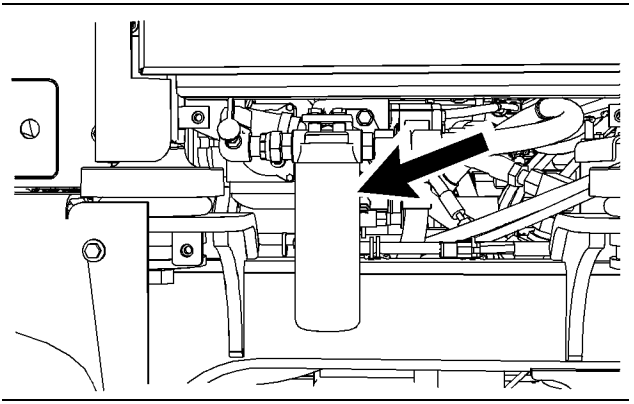


Illustration 240 g01135506

3. Use an oil filter strap wrench to remove the transmission oil filter. Dispose of the used filter properly.
4. Clean the filter base. Make sure that all of the used gasket is removed.
5. Apply a light coat of clean transmission oil on the new gasket. Install the gasket on the new filter.

6. Install a new transmission oil filter. When the filter contacts the filter base, tighten the filter by an additional 3/4 turn.

7. Start the engine. Apply the service brakes.

8. Disengage the parking brake.

9. Move the transmission direction control switch to FORWARD and to REVERSE in order to circulate the transmission oil.

10. Move the transmission direction control switch to the NEUTRAL position and engage the parking brake.

11. Inspect the filter for leaks. Check the transmission oil level.

    Reference: Refer to Operation and Maintenance Manual, “Transmission Oil Level - Check” for the correct procedure.

12. Reinstall the step assembly.

i02254945

Transmission Oil Level - Check

SMCS Code: 3030-535-FLV

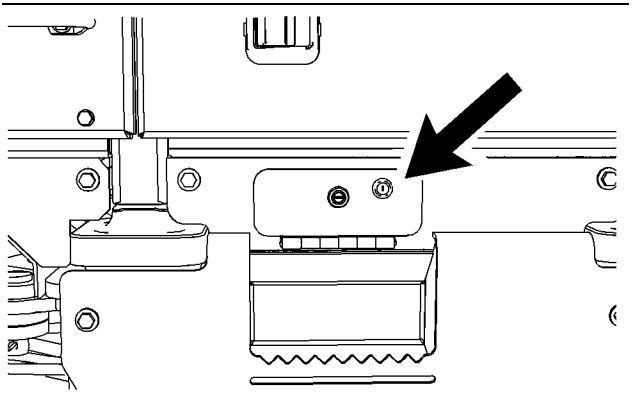


Illustration 241 g01135465

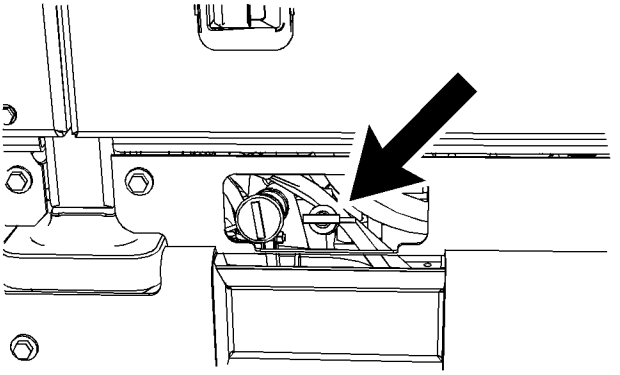


Illustration 242 g01135568

1. Open the access door on the right side of the machine.
2. Remove the dipstick and wipe off the dipstick with a clean cloth. This will ensure a more accurate measurement of the oil level.
3. Reinsert the dipstick and remove the dipstick again. Check the oil level. The oil level should be between the marks on the dipstick while the engine is running at low idle and the transmission is in neutral.
4. If the oil level is low, remove the oil filler cap and add transmission oil through the oil filler tube, as needed. Reinstall the oil filler cap.
5. Install the dipstick and close the access door.

i02255100

Transmission Oil Sample - Obtain

SMCS Code: 3080-008; 7542

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the machine for a few minutes before you obtain the fluid sample. This will thoroughly mix the fluid for a more accurate sample.

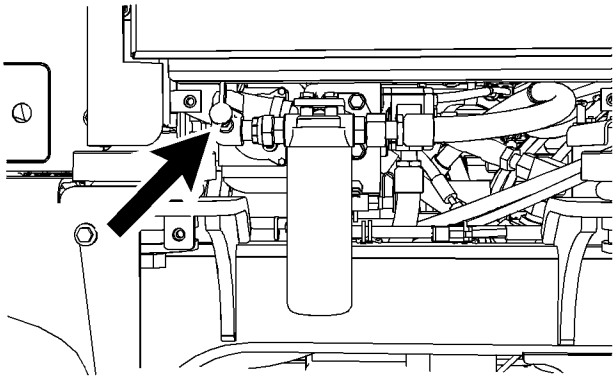


Illustration 243 g01135571

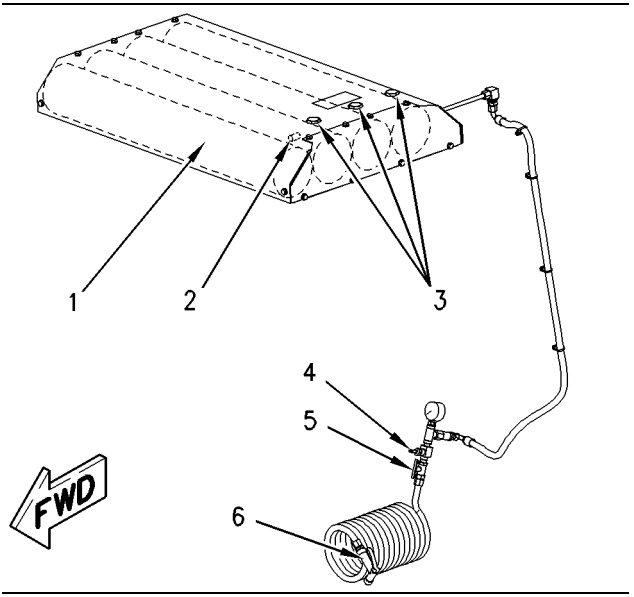
The transmission is equipped with a sampling valve. The sampling valve is located next to the transmission oil filter on the left side of the machine. Remove the step assembly under the left door in order to gain access.

Reference: For more information, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” and Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

i02393313

Water Cleaning System (Pressurized) - Purge (If Equipped)

SMCS Code: 5612-542; 5613-542



g00868210

Illustration 244

Water Cleaning System

(1) Water Tank
(2) Relief Valve
(3) Filler Plugs
(4) Air Valve
(5) Ball Valve
(6) Water Spray Nozzle

1. Open ball valve (5).

2. Use water spray nozzle (6) to expel all of the water from water tank (1). Allow the compressed air to escape through the nozzle also.

⚠ WARNING

Do not remove the fill plug until the pressure in the water tank has been relieved. Personal injury may result.

This fill plug has a cross drilled hole that allows the pressure to be relieved without disengaging the threads.

Do not replace this fill plug with any other plug.

3. Unscrew filler plugs (3) for two complete turns in order to relieve pressure.

4. Once the pressure is relieved, remove filler plugs (3).

5. Close ball valve (5). Fill the tank with 60 L (16 US gal) of water.

Note: If the outside temperature is below freezing, use a propylene glycol based antifreeze in the water tank. The antifreeze should be a non-toxic antifreeze that is used in recreational vehicles.

6. When water tank (1) is full, install filler plugs (3).

7. Connect an air hose to air valve (4). Pressurize water tank (1) to 345 kPa (50 psi).

8. Open ball valve (5).

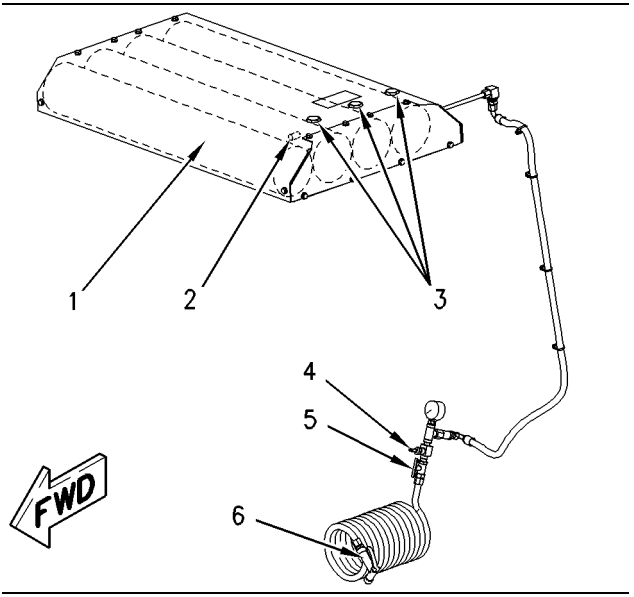
9. Expel the water from water spray nozzle (6). If the discharge is not strong, repeat the purging process. If there is still a problem, remove the hose and the lines and check for an obstruction.

10. Once the purging process is complete, fill and pressurize the water tank.

i02143406

Water Cleaning System (Pressurized) - Test

SMCS Code: 5612-081; 5613-081



g00868210

Illustration 245

Water Cleaning System

(1) Water Tank
(2) Relief Valve
(3) Filler Plugs
(4) Air Valve
(5) Ball Valve
(6) Water Spray Nozzle

1. Remove the water hose from behind the seat. Open ball valve (5).

2. Squeeze water spray nozzle (6) in order to expel the water. There will be pressure as the water is expelled. If there is very little water pressure, purge the water cleaning system.

3. After you test the water cleaning system, refill water tank (1). Water tank (1) must also be pressurized.

Reference: For information on purging and pressurizing the system, refer to Operation and Maintenance Manual, “Water Cleaning System (Pressurized) - Purge”.

i02786672

Winch Drive Shaft Spline - Lubricate (If Equipped)

SMCS Code: 5178-086

Note: This procedure only pertains to machines that are equipped with a mechanical winch.

Wipe off the fitting before you apply any lubricant.

Apply lubricant through one fitting on the drive shaft spline.

i02786655

Winch Drive Shaft Support Bearing - Lubricate (If Equipped)

SMCS Code: 5178-086

Note: This procedure only pertains to machines that are equipped with a mechanical winch.

Wipe off the fitting before you apply any lubricant.

Apply lubricant through one fitting on the top of the support.

i02216955

Winch Drive Shaft Universal Joint - Lubricate (If Equipped)

SMCS Code: 5178-086

Note: This procedure only pertains to machines that are equipped with a mechanical winch.

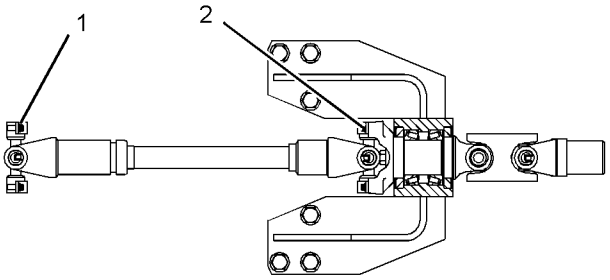


Illustration 246 g01118824
Top View

Wipe the fittings before you apply any lubricant.

Apply lubricant through fittings (1) and (2) on the rear drive shaft.

There is a total of two fittings.

i01367960

Winch Drum Bearing - Lubricate

SMCS Code: 5159-086-BD

Note: This procedure only pertains to machines that are equipped with a Caterpillar C-500 Series winch.

Wipe off the fitting before you apply any lubricant.

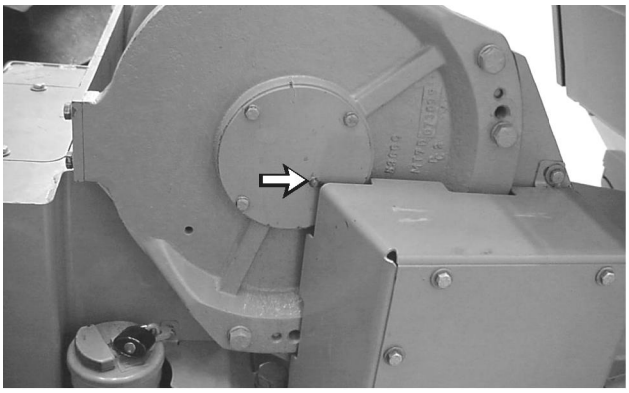


Illustration 247 g00721798

Apply a small amount of lubricant through the fitting on the right side of the winch. Excess lubricant may escape from the vent hole in the cover plate.

i04794110

Winch Fairlead Rollers - Lubricate

SMCS Code: 5163-086; 5163-086-RLR

Wheel Skidder with Mechanical Winch and Grapple Only

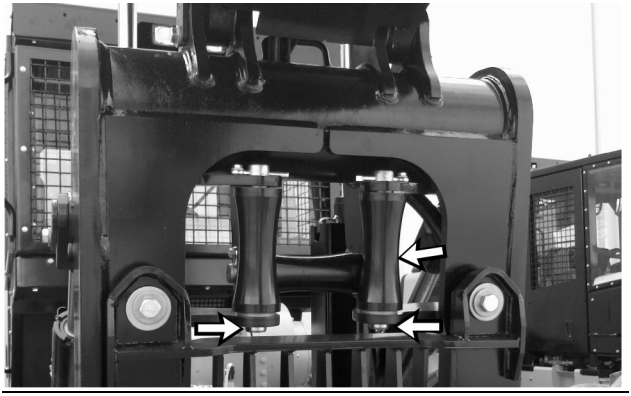


Illustration 248 g02911616

Apply MPGM Grease (lubricant) to the fairlead grease fittings, as shown.

i02456564

Winch Oil - Change

SMCS Code: 5163-044

⚠ WARNING

Personal injury can result from winch oil pressure and hot oil.

Oil pressure can remain in the winch system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the winch system.

Make sure the engine is stopped, and the oil is cool, before you remove any components or any lines.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Dealer Service Tool Catalog” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Mechanical Winch

Note: This procedure only pertains to machines that are equipped with a Caterpillar C-500 Series winch.

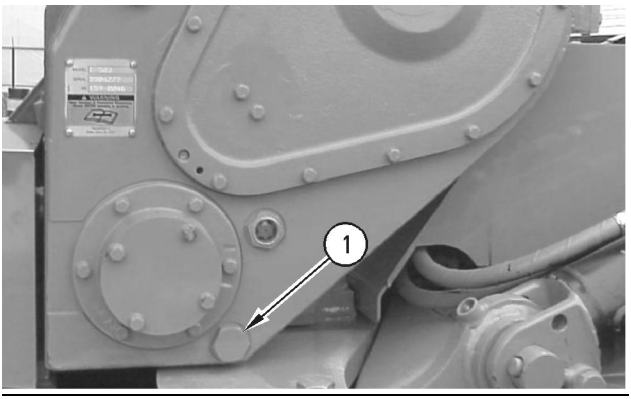


Illustration 249 g00694842

1. Remove drain plug (1) on the left side of the winch. Attach a hose to a suitable drain adapter. Install the adapter in the drain valve and allow the oil to drain into a suitable container.

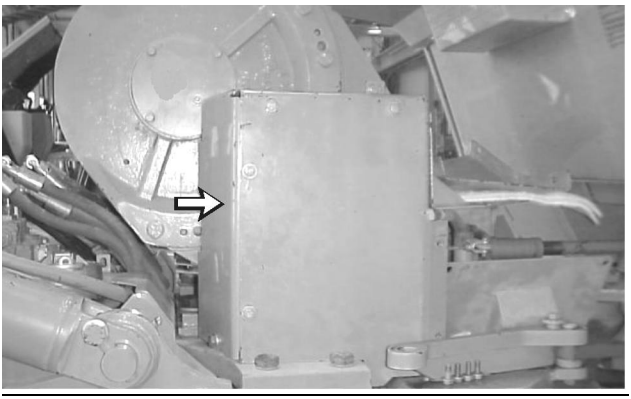


Illustration 250 g00672642

2. Remove the protective cover from the right side of the winch.

3. Disconnect the return line from the fitting.

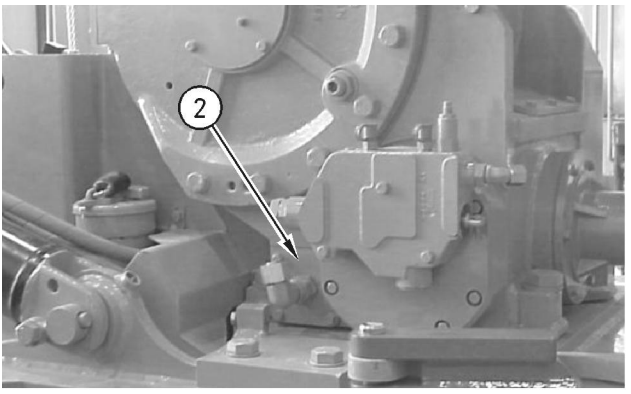


Illustration 251 g00690980

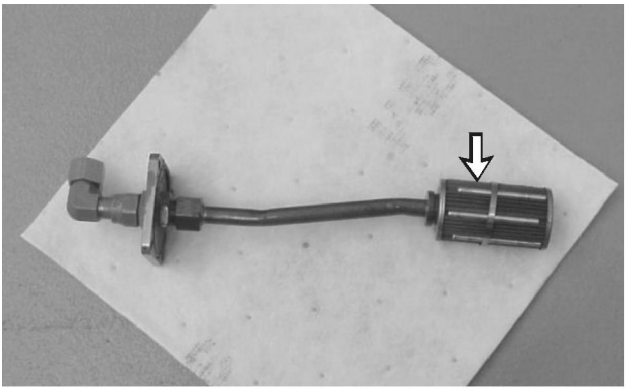


Illustration 252 g00699155

4. Remove the four bolts and cover (2) on the lower right side of the winch. Remove the strainer from the winch. Remove the strainer from the suction tube. Remove the metal band and the magnets from the strainer.

5. Wash the strainer and the magnets in a clean, nonflammable solvent. Use compressed air to dry the parts.

6. Inspect the strainer. Replace the strainer if the strainer is damaged or plugged.

7. Install the magnets and the metal band on the strainer. Apply clean winch oil to the O-ring seal and install the strainer on the suction tube.

8. Inspect the cover seal for wear or for damage. Replace the cover seal, if necessary. Install the cover and the four bolts.

9. Reconnect the return line to the fitting.

10. Reinstall the protective cover.

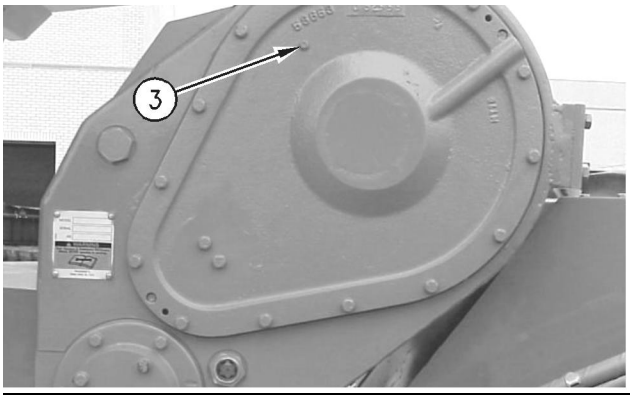


Illustration 253 g00694843

11. Remove vent plug (3) on the left side of the winch. Clean the vent plug in a clean, nonflammable solvent. Install the vent plug.

Note: Do not replace the vent plug with a solid plug. Do not apply paint over the vent plug. Either condition may cause oil leaks due to increased internal pressure during operation of the winch.

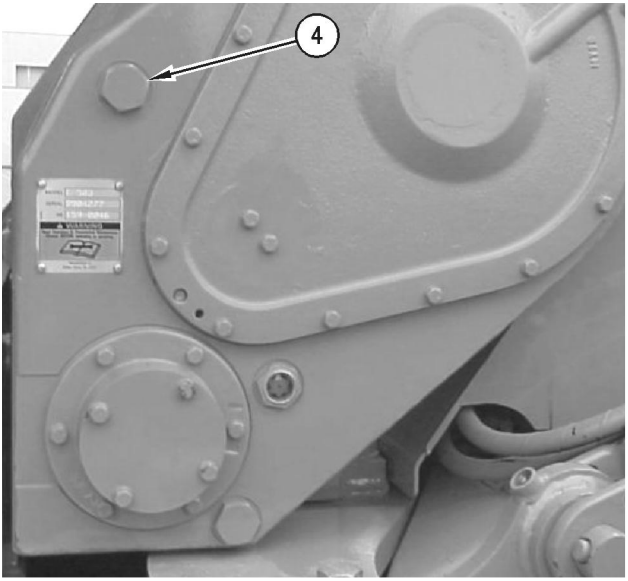


Illustration 254 g00694839

12. Remove filler plug (4) and fill the winch with oil through the opening.

Reference: Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the correct amount of oil.

13. Clean the filler plug and install the filler plug. Clean the vent plug and install the vent plug.

Hydraulic Winch

Note: The line for the hydraulic winch must be extended in order to expose the drain hole in the center of the winch.

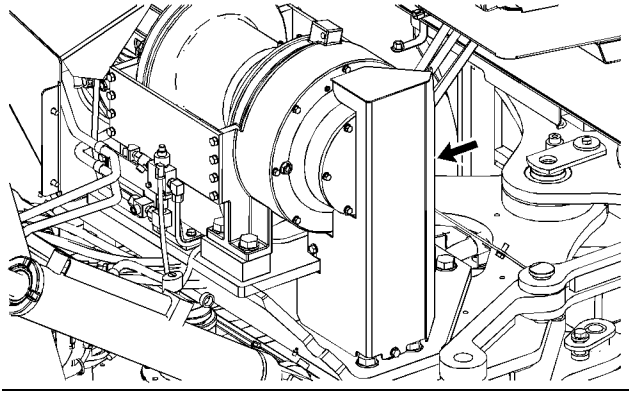


Illustration 255 g01231645

1. Remove the cover plate on the right side of the winch.

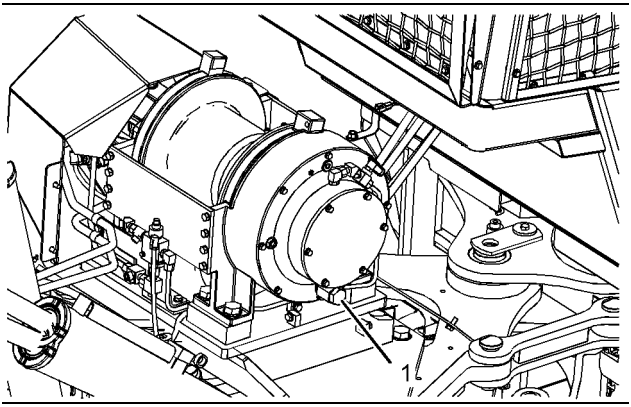


Illustration 256 g01225969

2. Remove drain plug (1) on the right side of the winch. Attach a hose to a suitable drain adapter. Install the adapter in the drain valve and allow the oil to drain into a suitable container.

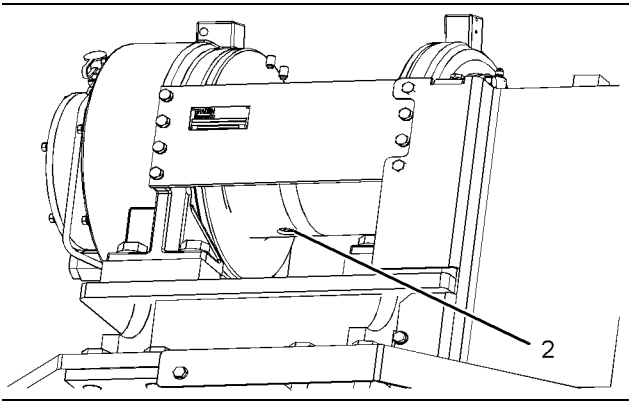


Illustration 257 g01231535

3. Remove drain plug (2) on the center of the winch. Attach a hose to a suitable drain adapter. Install the adapter in the drain valve and allow the oil to drain into a suitable container.

4. After you have drained the oil, remove the adapters from the drain openings.

5. Clean the drain plugs and install the drain plugs.

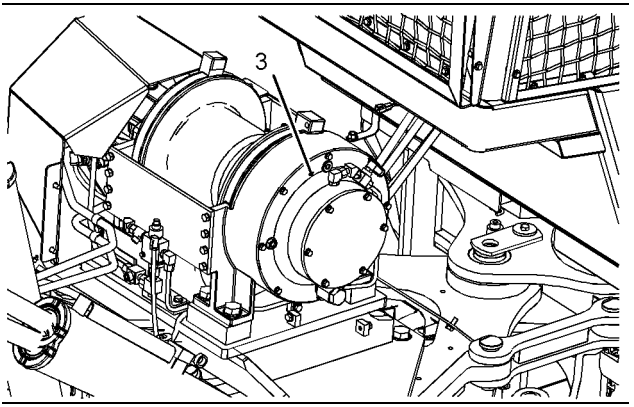


Illustration 258 g01231657

6. Remove vent plug (3) on the left side of the winch. Clean the vent plug in a clean, nonflammable solvent. Install the vent plug.

Note: Do not replace the vent plug with a solid plug. Do not apply paint over the vent plug. Either condition may cause oil leaks due to increased internal pressure during operation of the winch.

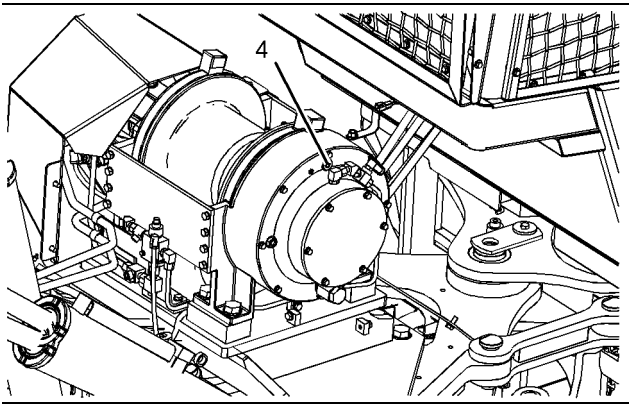


Illustration 259 g01231668

7. Remove filler plug (4) and fill the winch with oil through the opening.

Reference: Refer to Operation and Maintenance Manual, “Capacities (Refill)” for the correct amount of oil.

8. Clean the filler plug and install the filler plug. Clean the vent plug and install the vent plug.

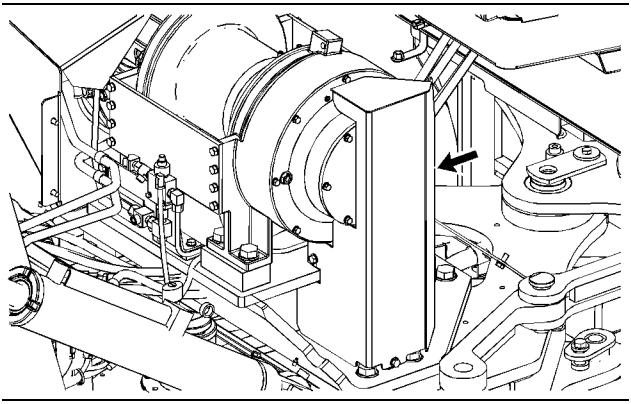


Illustration 260 g01231645

9. Install the cover plate on the right side of the winch.

i02156039

Winch Oil Filter - Replace

SMCS Code: 5177-510

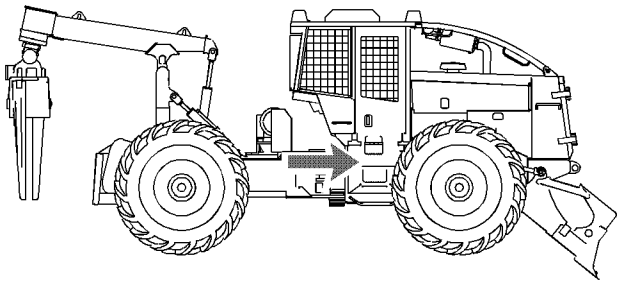


Illustration 261 g01096103

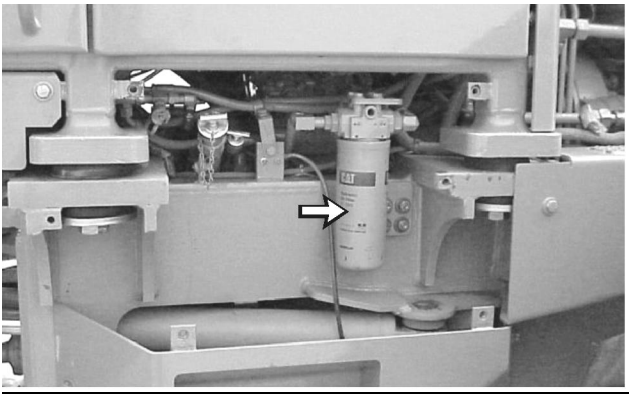


Illustration 262 g00698328

1. Remove the access panels on the right side of the machine in order to access the winch oil filter.

2. Use a strap type wrench to remove the oil filter. Clean the filter base and dispose of the used filter properly.

3. Apply a thin coat of oil to the seal of a new filter and install the filter by hand. When the filter contacts the filter base, tighten the filter by an additional 3/4 turn.

4. Install the access panels.

i01312912

Winch Oil Level - Check

SMCS Code: 5163-535-FLV

Note: This procedure only pertains to machines that are equipped with a Caterpillar C-500 Series winch.

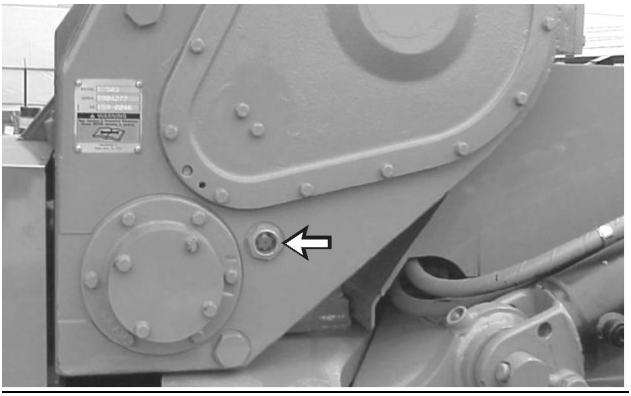


Illustration 263 g00694965

The sight gauge is on the left side of the winch.

Check the oil level of the winch, when the engine is stopped. Maintain the oil level within the sight gauge. Add oil, if necessary.

i02127842

Winch Oil Sample - Obtain

SMCS Code: 5163-008; 7542

⚠ WARNING

Hot oil and components can cause personal injury.

Do not allow hot oil or components to contact skin.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, “Caterpillar Tools and Shop Products Guide” for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Operate the machine for a few minutes before you obtain the fluid sample. This will thoroughly mix the fluid for a more accurate sample.

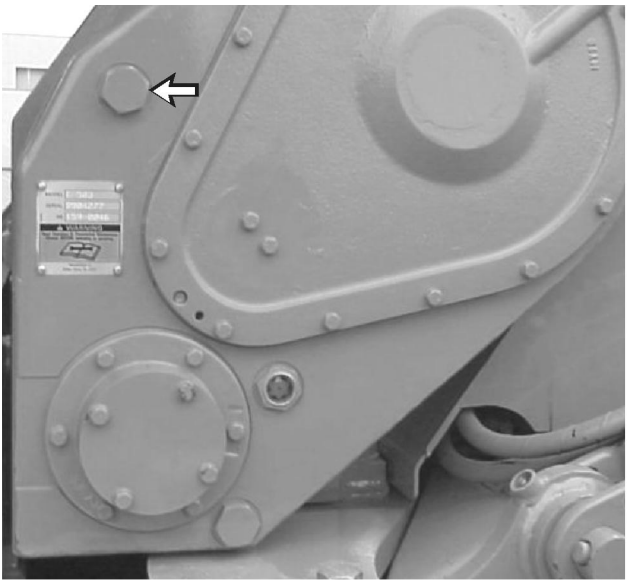


Illustration 264 g00697412

The winch is not equipped with a sampling valve. Obtaining a sample of the winch oil will require a vacuum pump or an equivalent. Remove the filler plug from the left side of the winch and withdraw the oil sample.

Reference: For more information, refer to Special Publication, SEBU6250, “Caterpillar Machine Fluids Recommendations” and Special Publication, PEHP6001, “How To Take A Good Oil Sample”.

i00947128

Winch Wire Rope - Install

SMCS Code: 5154-012

WARNING

Personal injury or death can result from improper wire rope use.

Always wear gloves when handling wire rope.

Note: Ferrules are made in various sizes. Make sure that you use the correct ferrule for the size of the wire rope.

Table 15

Caterpillar C-500 Series Winch	
Diameter of Wire Rope	**Ferrule (Part Number)**
19 mm (3/4 inch)	118-6273
22 mm (7/8 inch)	118-6275
25 mm (1 inch)	118-6276

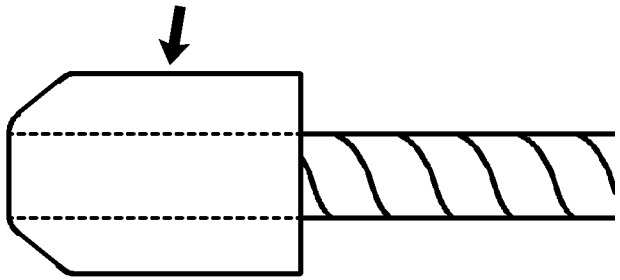


Illustration 265 g00483393

1. Attach a ferrule to the end of the wire rope.
2. Wrap the wire rope once around the drum and slide the ferrule into the slot in the drum. Make sure that the wire rope is installed so that the wire rope will be reeled in over the top of the drum.
3. Move the winch control lever to the REEL IN position in order to wind the wire rope onto the winch drum.

Note: The wire rope will detach if the wire rope is unwound below one full turn. Applying red paint to the last six coils of the wire rope will help to serve as a visual warning.

i02176858

Window Washer Reservoir - Fill

SMCS Code: 7306-544

NOTICE
When operating in freezing temperatures, use Caterpillar nonfreezing window washer solvent or equivalent. System damage can result from freezing.

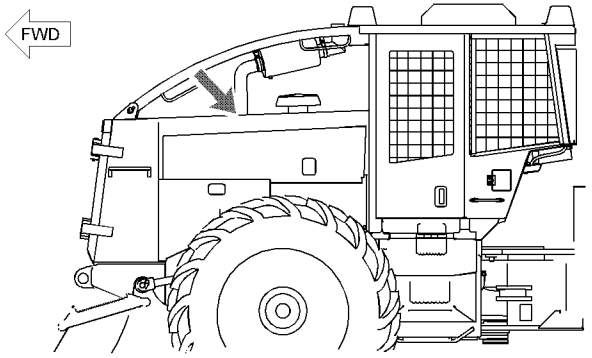


Illustration 266 g01102225

The window washer reservoir is located inside the top engine access cover on the left side of the hood.

Fill the reservoir with window washer solvent.

i02143121

Window Wiper - Inspect/Replace

SMCS Code: 7305-040; 7305-510

Inspect

Inspect the front wiper blade and the rear wiper blade. Replace the wiper blades if the wiper blades are worn or damaged or if streaking occurs.

The window wiper and/or the wiper motor should be replaced under the following conditions:

- The wiper arm is worn or damaged.
- The wiper motor is faulty.

Replace

Use the following procedure in order to install a new wiper and/or a new wiper motor on the front window and the rear window:

1. Move the transmission direction control switch to NEUTRAL.
2. Engage the parking brake.
3. Place the steering frame lock in the LOCK position.
4. Remove the cover in order to access the wiper arm and the wiper motor.
5. Remove the wiper arm and the wiper motor.
6. Install the new wiper arm and/or the new wiper motor.
7. Reinstall the cover.
8. Place the steering frame lock in the STORED position.

i01921569

Windows - Clean

SMCS Code: 7310-070

Use commercially available window cleaning solutions in order to clean the windows. Clean the outside windows from the ground unless handholds are available.

Note: Use a damp cloth to clean the windows. Using a dry cloth will damage the surface of the window.